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[Communicated.]

Improvement in Steam Generators.

C. H. Gould's improved steam boiler, patented April 30, 1867, combines all the good qualities of the best boilers in use, occupying but very little room, and can be safely located upon the working floor of any store, warehouse, or manufactory.

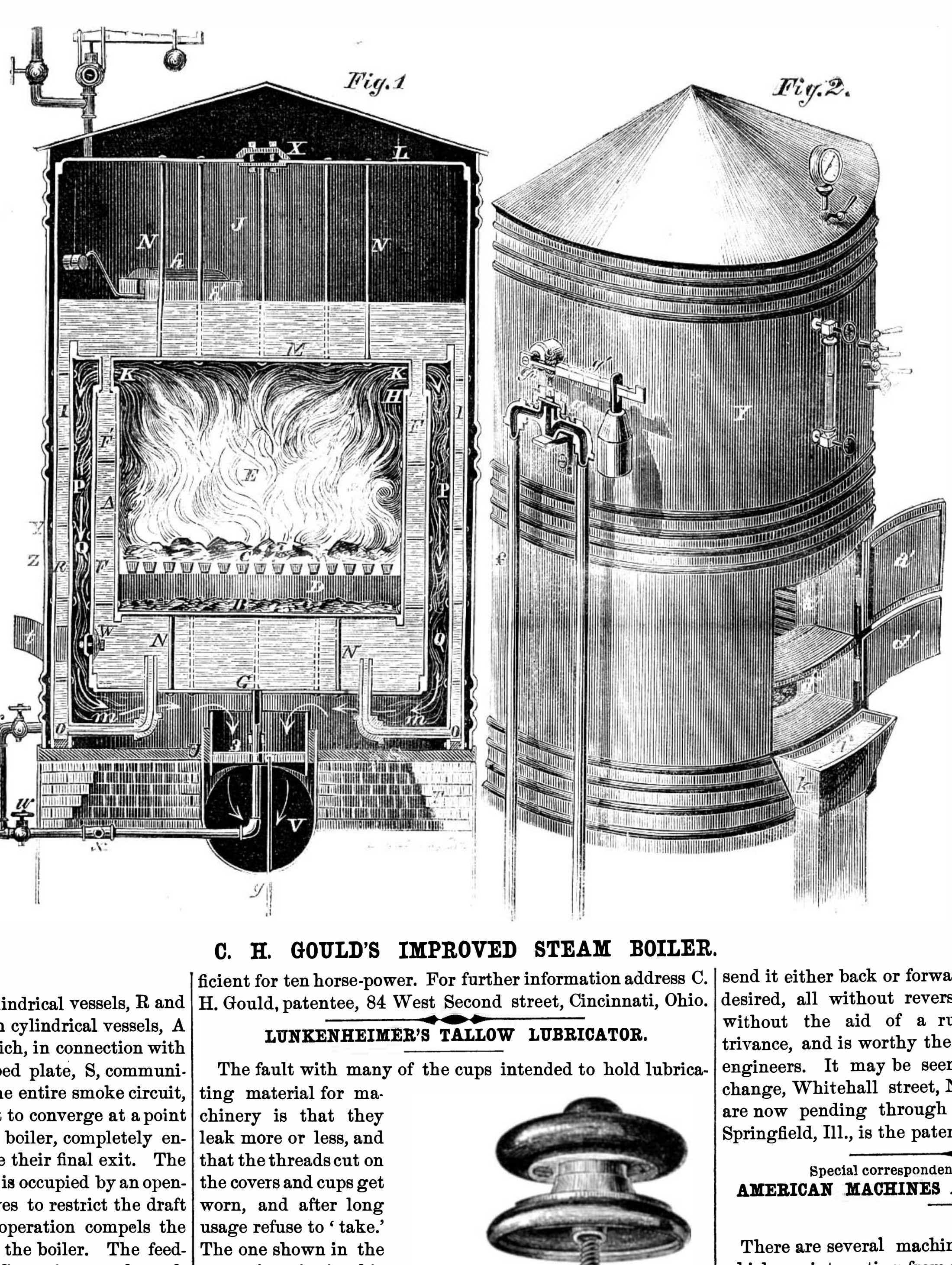
In the illustration the boiler is shown divided in the plane of its axis into two equal parts, of which Fig. 1 is an interior and Fig. 2 an exterior view.

A, is a cylindrical vessel open at the top and closed below by bottom, B, supported a short distance above which bottom is a grate, C, so as to form an ash pit, D, and a fire chamber. E. F is a vessel larger than, but of similar shape to the vessel, A, which it surrounds concentrically, so as to form a water jacket, F', between them; and the two heads, B and G. H is an annular plate which joins the upper edges of A and F, so as to close at the top the annular space or jacket, F between them. J, is a drum-shaped chamber which is supported a short distance above and connected with the water jacket, F', by means of a series of short pipes, K. The bottom, M, of the drum, J, constitutes the crown of the fire chamber, E, while the top or head, L, of the drum constitutes the crown of the steam space. The flat plates, B G L M, are suitably stayed by bolts, such as are represented at N. All its parts being cylindrical in form, can be easily made to resist any desired pressure.

The bottom, M, is joined to the cylindrical vessel, P, at the top, which vessel is joined at the bottom by ring, O, to cylindrical vessel, R (or outside shell of boiler), the two forming water jacket, I. The water jackets, I and F', are securely stay-bolted as represented.

The pipes, *m m*, connect the inner and outer water jackets at the bottom, as the short pipes, K, connect them at the top. X is a man-hole into the steam chamber, and W is a hand-hole into the lower water chamber.

The parts above described constitute the boiler proper, which rests at O O on iron bed plate, S, which in turn rests on masonry, T.



C. H. GOULD'S IMPROVED STEAM BOILER.

The outside water jacket between cylindrical vessels, R and P, and the inner water jacket between cylindrical vessels, A and F, form the descending flue, Q, which, in connection with the opening, U, through the center bed plate, S, communicating with horizontal flue, V, makes the entire smoke circuit, and thus obliges all the flame and heat to converge at a point immediately under the center of the boiler, completely enveloping the inner water jacket before their final exit. The central aperture through bed plate, S, is occupied by an open-ended cylindrical damper, 3, which serves to restrict the draft or shut it off altogether, and by its operation compels the heat in passing to hug the bottom of the boiler. The feed-water pipe, which enters the boiler at G, passing up through the smoke flue, serves as a guide for the damper.

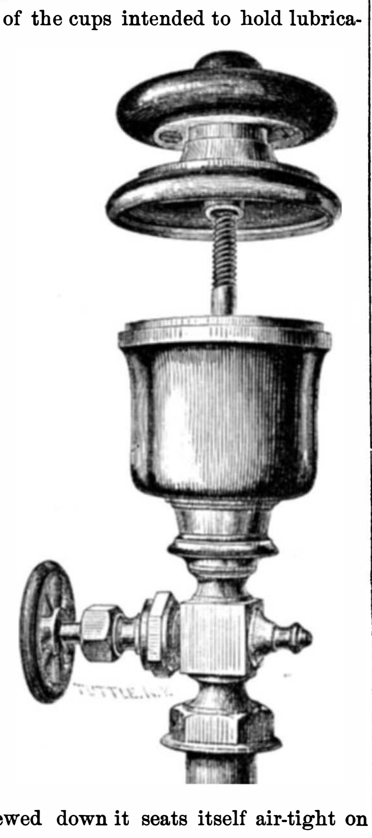
It will be readily seen that a very large plain vertical generating surface is obtained in this form of boiler; also that the bottom of the steam chamber (the water line being some inches over it) affords a large surface for the direct action of the fire; that the most intense heat is where it is wanted, and that as it diminishes, passing off downward, it approaches in its final exit the bottom of the boiler where the water is thrown in; that it has no confined or horizontal smoke passages, and therefore any kind of fuel can be used and the generating surface kept clean; that the direction of the flues is such as to form an inverted air chamber for the heated air and gases, which can only pass off as they are forced by the draft; that the hottest part of the smoke and gases is thrown in contact with the hottest part of the generating surface, and that the generating surface will at no point return or give back heat to the smoke.

More than a year's use of this form of boiler proves that all the dust or sediments in the water settle on the bottom, G, except a small portion in the water jacket, I, at O, both of these parts being the furthest removed from the fire, and not liable to be burned that it is a very rapid generator of steam, and will make as much steam from the fuel as any form of boiler that has water space enough to be safe.

Y, in Fig. 2, is an outer shell or case of "galvanized" iron, having between it and the outer shell of the boiler a narrow air space for the purpose of controlling the radiation, making it doubly secure as to fire, besides giving a neat outside finish. This engraving also shows the outside appearance of C. H. Gould's patent water regulator, with the conducting pipe from reservoir to stop, *g*, and pipe, *f*, leading to the forcing pump. An ash spout, *h*, leads to the ash chamber formed by the foundation walls of the boiler. A boiler of this construction 52 inches in diameter and 6 feet high is found amply sufficient for ten horse-power. For further information address C. H. Gould, patentee, 84 West Second street, Cincinnati, Ohio.

LUNKENHEIMER'S TALLOW LUBRICATOR.

The fault with many of the cups intended to hold lubricating material for machinery is that they leak more or less, and that the threads cut on the covers and cups get worn, and after long usage refuse to 'take.' The one shown in the engraving is in this respect entirely different. The cup proper is of the ordinary form and has seated in the center of its bottom a steel spindle, which projects above the top of the rim and engages with a thread cut in the center of the top knob, which is of wood and has a core of brass to which it is secured. The cover is attached to this knob or rather to its shank, and turns freely upon it. The edge of the cup's rim has an annular recess filled with Babbitt or other soft metal, and when the cover is screwed down it seats itself air-tight on this soft bed and prevents all waste of material. The knob or handle being of wood is never too warm for the hand.



This cup is intended especially for tallow, which is greatly preferred to oils for lubricating engine cylinders. When oil is subjected to the heat of "live" steam it is frequently decomposed into its components of glycerin and acids, and loses its value as a lubricator, while tallow, requiring a greater heat for its decomposition, gradually melts and passes into the steam chest and cylinder in the form of a liquid lubricator. The bottom of the cup is pierced with a number of small holes, surrounding the steel spindle, which open into the passage through the gate.

The whole device is very simple in its parts and does not appear liable to get out of order. It is also ornamental in form and finish and seems to be well adapted to its uses as a steam cylinder lubricator.

Patented by F. Lunkenheimer who can be addressed at the Cincinnati Brass Works, Nos. 10 and 16 East Seventh street, Cincinnati, O.

A Novel Propeller.

A few days ago we examined the construction and observed the operation of a small working model of a propeller on a plan quite unique. It consists of three vertical blades placed equi-distant around an upright shaft at the stern of the vessel, the lower end of the shaft working in a step on the prolongation of the keel. The shaft by which the blades are driven works inside a hollow shaft, on which is secured a horizontal eccentric, which connects by arms with the blades, and feathers them as they rotate. No rudder is used with this propeller, the set of the eccentric and blades, by means of a lever, determining the line of the vessel's progress. Further description without the aid of engravings, could not be understood.

The performances of the model are quite surprising. The vessel was made to turn exactly on its center repeatedly, without going ahead, and a slight turn of the adjusting lever would send it either back or forward in a direct line, or in any circle desired, all without reversing the driving machinery and without the aid of a rudder. It is a remarkable contrivance, and is worthy the attention of our mechanics and engineers. It may be seen in operation at the Corn Exchange, Whitehall street, New York city. Foreign patents are now pending through this office. Mr. F. G. Fowler, of Springfield, Ill., is the patentee.

Special correspondence of the Scientific American.

AMERICAN MACHINES AT THE PARIS EXPOSITION.

Paris, July 2d, 1867.

There are several machines in the American department which are interesting from their ingenuity and efficiency, and accordingly attract considerable attention. First, may be mentioned the Hicks engine, now well known in America, of which several different sizes are exhibited. Our people seem to have a great fondness for endeavoring to produce a steam engine which shall be the most compact, cheap in first cost, and appear, at least, very simple in construction. As evidence of this, witness the host of rotary engines we have brought forward, (and, by the way, as good an example of these as I have ever seen is to be found among our machines in the Exposition,) of which, however, it would hardly be too sweeping an assertion to say, that none are of any value. The reason that so few of such engines have come permanently into use is, that users of power have not been long in discovering that where compactness, or cheapness, or the absence of moving parts from view were obtained by an utter disregard of the amount of steam to be consumed or wasted, and the cost of repairs after wear, the price paid for the former qualities was altogether too dear, and they have concluded that it was more agreeable to see a good-sized coal pile than a mysteriously simple engine. The Hicks engine, however, is a complete exception to these remarks, for though compact, cheap, and invisible as to its moving parts, yet these quali ties have not been obtained by a sacrifice of economy in the distribution of steam, or the multiplication of rattling packing pieces, or still worse, the total absence of any piston packing at all. This engine may fairly claim to compete with the ordinary form of steam engine, which is more than can be said of most machines of this class. A really good machine is Root's blower for cupola furnaces and similar purposes. The volume and pressure of blast delivered from the one which he has on exhibition is really astonishing when we observe how slow, comparatively, is the speed with which it is run. Blowers of this class, in which the air is forced out by the regular displacement, are far preferable to the fan in point of economy, and apparently Root's is very free from the objections that exist, with some forms, in respect of excessive friction and consumption of oil or tallow. Blowers of this kind are unknown in England, but engineers can hardly be long in appreciating their advantages and introducing them.

Next we find an excellent nail machine, cutting a perfect shower of nails out of a plate at one operation. The simplicity of the machine is partly due to the particular form of nail which it produces, and this, therfore, should be described first. In one direction its sides are parallel throughout, and its thickness equal to that of the plate from which it was cut. In the other it tapers from one end to the other, and then has a short bevel on each side, forming a point. This bevel, at the point, is exactly the counterpart of that under the head, so that when two nails are placed point to head, they exactly fit together, and it is in this way that they are cut. This peculiarity enables the nails to be cut without any waste metal whatever except that which is produced at the first and last cut on each sheet. The machine consists of a feed table over which is placed a stout rocking lever carrying the cutters, eight or ten in number, according to the size of the machine. At each stroke of this lever it chops off one less nail than the number of cutters. The feed is so arranged that at each stroke the sheet is moved sideways and back and forth alternately the length of one nail, and the cutters are alternately beveled in opposite directions so that the taper that is given to one side of the nail, under one cutter, shall be in the opposite direction from that which will be given to the other side by its neighbor at the next stroke. The sheets from which the nails are cut are about 20 inches wide, and may be of any convenient length within the limits of the width to which they can be rolled, the grain running across the plate so as to be lengthways in the nail. The cutters are made very strong, are planed to the proper form, and then only require grinding across the end as they wear. The only difficulty that would suggest itself at first thought would be whether the lip, which undercuts one side of the head, would not often become broken and require a large amount to be ground off to bring it again to an edge; but this, it is stated, does not occur in practice. The machine is capable of producing 5,000 lbs of nails per day. The nails are not of a form to cause splitting, and it is stated that they are preferred by those who have used them to any other form.

Near this machine we have another, ingeniously designed for molding matrices for stereotype plates by a process of composing, instead of setting up type for the purpose. The matrix is formed of soft, thick paper, and the impressions in it are made by steel dies moved by a cam by power coming from a foot treadle, the action of the cam being determined by touching the keys of a keyboard as in type-setting machines. The paper matrix is fed along at the proper rate after each impression to produce the words and lines. Specimens are shown of stereotype plates made in this way, and also of printing from the plates, both of which look very well.

Again, we have a neat machine for dressing the sides of type after they have come from the molds. The types are placed in rows, and between each row a brass space; a number of rows thus making up a block of any size. Each row in succession is passed sideways between a set of inclined cutters which remove all inequalities, and the finished type are received at the other side of the cutters and re-formed into a block, the brass spaces, however, having been left behind. The motions of the parts of the machine are so arranged as to avoid the possibility of the rows becoming broken or the type getting displaced.

In wood-working machinery there are a few good things, but any one familiar with the subject can see that it would be easy to go into any good shop, where tools are abundant, and select a far more interesting stock than that which professes to represent the whole nation.

There is one tool, however, that is a novelty, and well deserving of praise. It is a machine for turning banisters or other ornamental turned work. The only operation required in running it, is to start the machine once for all, and then, without stopping, put in the square sticks and let down the cutter on it; it then finishes itself and is ready for another stick. The construction is as follows:—An iron frame, sliding vertically in guards, carries an inclined finishing cutter. The vertical side of this cutter is planed to the pattern which it is desired to turn, and as it wears, it is only necessary to grind the end. This cutter has a vertical direction coinciding with the frame, and as the latter descends it comes in contact with the work at one side and passes partly by it. Its inclined position causes it to commence its work at one end and continue along to the other as it descends. To prepare the way for the finishing tool two other cutters go before, the first roughing off the corners of the stick and the second traveling over the edge of a former, begins the finished pattern. These cutters are made to move along by an inclined groove in the moving vertical frame which carries the finishing cutter. The working of the tool is beautifully simple, and it turns out a well-finished piece of work. The end of the spindle is made with a central point projecting beyond the griping edges, so that the work may be caught on this without stopping until the tail stock is screwed up, when the teeth catch it and set it in motion.

A set of cask-making machines are shown for flour barrels and other dry work. The main features are not new, though the precise application of principles may be. They are of exceedingly rough workmanship.

A very neatly arranged sawing table is among the best tools. It has a fixed countershaft, for driving, placed beneath the floor, and the belt from this passes around a frame in which are fixed two arbors, the one carrying a rip saw and the other a cross-cut. By means of a worm gearing, either of these may be turned up so as to project above the table, and when it does of course its arbor and pulley alone take the strain of the belt, the other being down below it. The table is also provided with gage guides by which any angle may be given, either in ripping or cross-cutting, and it appears to be a tool that would be very handy in a shop.

Quite a number of Pickering's governors, of various sizes, are also exhibited, some of them being placed on the engines which are at work. This is quite new in England, but it is probably not equal in efficiency to Porter s, which is well known there, though it is vastly preferable to the old, slow-moving form.

Justice's "dead stroke" hammer is another novelty which appears to deserve well the attention which it attracts. Its capabilities for light or heavy work are exhibited at intervals by hammering out ingots of lead and drawing them down to a small bar. Its present success at home may have no little influence in its introduction here.

SLADE.

Alluding to the distribution of prizes, our correspondent says:—"The number of grand prizes awarded was 64; gold medals 883; silver 3,653; bronze 6,565; honorable mention 5,801, not including those for groups 8 and 9, which will not be awarded till the close of the Exposition.

"The only Americans who received grand prizes were Cyrus W. Field, for the Atlantic cable; Hughes, of New York, for his printing telegraph; and the Sanitary Commission, for the fine display of articles intended for the relief and comfort of soldiers during war. The Emperor awards the order of the Legion of Honor to the most eminent competitors in the Exposition, and, after the names of some of the members of the Commission and Jury, from the United States, are those of Mr. Goodwin and Mr. Elias Howe, for sewing machines, Mr. Mulat, engineer, and Chickering, of Boston, for Pianos. There was also a class of extra prizes for those establishments in which systems tending most toward the elevation and happiness of working men were in operation; and among these are some American names, such as the mills of Chapin, of Lawrence, Mass., to whom a prize was granted, and the Agricultural Colony, of Vineland, N. J., of which honorable mention was made. No award of this kind appeared to have been made to any English establishment, though it would seem that some of these are deserving of credit for the interest taken in their employees. The complete lists of those who have been rewarded with silver and bronze medals are of course too lengthy to be reproduced in a letter, but our countrymen will be found well represented among them in proportion to the number of articles exhibited by them."

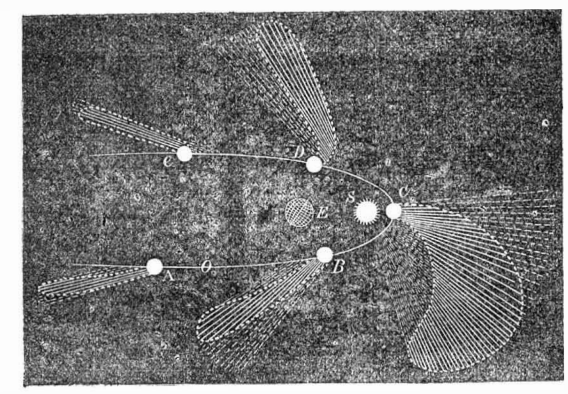
[For the Scientific American.]

WHAT ARE THE TAILS OF COMETS MADE OF?

The subject of comets is one so little understood, and we feel that we can add so little to the little already known that we enter upon the subject with much diffidence. To us the composition of comet's tails is not so mysterious as the composition of comets. The general opinion of astronomers is that comets are composed of ponderable matter and are subject to the law of gravity same as planets, but unlike planets are only a gaseous film. And yet comets have been seen as a dark body upon the face of the sun when in transit across the disk of that bright luminary. The orbits and motions and periods of some comets so much resemble the orbits and motions and periods of planets that it would indeed seem that they too are ponderable substances, while the small size, great velocity, vast orbits and periods of others is strong evidence of their imponderable quality. But it is not generally claimed that the tails of comets are ponderable substances. Although it would seem that the tails of comets, like the caudle appendage of all bodies that are so equipped, should be composed of the same material in kind as their bodies, but the enormous velocity required of the extremity of a tail 150 million miles long when sweeping around the sun in passing its perihelion is far too great for any ponderable substance to attain to.

In order to understand any phenomenon of Nature we must first study her language and thus learn her laws. Every phenomenon of Nature is governed by some one law that controlls all, notwithstanding a diversity of phenomena may seem to flow from that one law. Having once learned the general law it becomes an easy matter to interpret the cause of all apparent departures from that law. One law of comets is that they—as a rule—have but one tail, although as many as six have been seen. Another law is that the tail is—as a rule—seen in opposition to the sun, whether the comet is approaching to, or receding from the sun. This is their most distinguishing characteristic, and is what has so bewildered the master minds of all ages and all countries. The great Sir Isaac Newton was of the opinion that comets' tails were ponderable, but of such extreme tensity, that if the largest one that was ever stretched across the heavens were compressed into one cubic inch it would still be less dense than air. On this latter point we entirely agree with the great English geometer, for let it be known to all people that the tails of comets are only the reflection of light, simply the rays of the sun coming in contact with the substance of the comet and thereby becoming intensified (electrified). When like rays from the same sun strike the surface of a planet they are reflected greatly modified. Comets cast a brightness which diverges, planets cast a shadow which converges, clearly proving that the substance of the two are not the same.

All are familiar with the streaming rays reflected from a calcium light as they are seen to pierce through deep darkness, expanding and also becoming more dim as they lengthen, presenting the appearance of a solid body for a great distance and gradually vanishing from sight. These are in fact artificial comet tails, governed by the same law as proved by their expansion and diminishing in brightness as they lengthen. The tails of comets continue to expand as they lengthen and contract as their length decreases, thus proving that they are governed by the same law as the reflection of light. Again, the t. l increases in length and breadth as the comet approaches the sun and decreases in length and breadth as it recedes from the sun, further evidence that it is governed by the law that governs the reflection of light. But how are we to explain the phenomena of two or more tails? Well, if the tails of comets are but the reflection of the electrified rays of the sun, it follows that the rays must strike a surface capable of reflection, and no light can be reflected when the ray strikes a surface perpendicularly. Now then, comets of a true spherical form reflect one tail, comets of an irregular spheroidal form reflect more than one. A perfect sphere will always reflect one tail in opposition to the sun, while those presenting to the sun various surfaces with various angles will show as many tails as angles presented; the direction of each will conform to the law governing the reflection of light, viz., the angle of incidence and reflection will be the same.



We next propose a demonstration in confirmation of the idea that comets' tails are simply a reflection of the electrified rays of the sun. In stating our premises we remark first, that the velocity of comets may be computed at one million miles an hour, and the velocity of light twelve million miles a minute, while the length of a tail may be reckoned at 150 million miles. Suppose in the plate above we represent a vertical view of S, the sun, E, the earth, and O, orbit of a comet sweeping around the sun with the velocity of one million miles an hour. Now then, when the comet is seen from the earth at A and B the tail is seen in the rear of the comet; when at c, at the side, and when at D and e, it is in advance of the comet, but in all cases it is seen in opposition to the sun. Now, suppose that the comet when at B and D is distant from the earth one hundred million miles; at that distance light would require 8m., 20 sec., to reach the earth, while light from the extreme verge of the illumination would require 20m., 50sec., to reach the earth; but by the time light from the head of the comet reaches the earth the comet will have swept along its path nearly two hundred thousand miles, and by the time the light from the extremity of the tail reaches the earth the comet will have traveled more than three hundred and twenty-five thousand miles. As the comet speeds along its path the light in the rear of the comet begins to fade out in 8 m. 20 sec., beginning at the path, and in 12 m. 30 sec., a ray will have vanished out the entire length of the tail, while at the same instant the rays of light shooting out from the head of the comet are speeding their flight to the extremity and will arrive there in 12 m. 30 sec.;

The dotted portions indicate the fading-out rays in the rear of the comet and the rays not yet filled out in advance of the comet. Now as light requires 12 m. 30 sec. to travel the length of the tail and as the comet will have traveled two hundred thousand miles in the same time, it follows that the extremity of the tail must fall behind the apparent position of the comet as seen from the sun two hundred thousand miles, and more than three hundred and twenty five thousand miles as seen from the earth, when the comet is at B. The curvature of the tail is wholly dependent upon the curve of the path the comet is moving in at the time.

The singular phenomenon of the tail preceding the comet when the comet is receding from the sun is all owing to the velocity of light being much greater than the velocity of a comet. Light travels as far in five minutes as a comet does in sixty minutes. The short and beautiful curve of the tail, always seen near its root, when the comet is receding from the sun, is owing to the fact, that the rays shot out from the comet and the course the comet is traveling at the time, are in the same general direction, which enables the comet to double up, as it were, a portion of its own tail; that is, the speed of the comet is superadded to the speed of light. whereas, when the comet is approaching the sun the cometric rays simply fall behind, producing a curve in the tail equal to the curve of the path in which it is traveling.

G. M. RAMSAY, M. D.

New York City, July, 12, 67

GREAT GUNS AND BREECH-LOADING FIRE-ARMS.

So far as actual trial can demonstrate a fact, it would seem that this country is still ahead in the production of the most powerful cannon. Our fifteen-inch smooth bores have been tested in actual conflict, and have proved the most effective weapons of modern warfare. There is no adequate reason for supposing the twenty-inch would prove a failure under similar circumstances. The English government have lately been experimenting with a fifteen-inch Rodman, cast by Cyrus Alger, at South Boston, and its performances appear to have awakened considerable interest. The gun weighs 19¼ tuns, and with it was sent a quantity of our mammoth cannon powder and a number of the spherical shells. From the London *Standard* we condense a report of the trials:—"The programme of Thursday's trials was with the object of testing the range, accuracy, and general working of the piece, and the velocity of the missiles when propelled by 35 pounds, 50 pounds, and 60 pounds of the American powder, and corresponding charges of English large-grained rifle powder, such as is used in our 7½-inch and 9-inch rifled guns. Fifteen rounds altogether were fired, and sufficed to give a valuable character to the weapon. The practice on such occasions as the present is to train the gun upon some definite object, such as a target, in a nearly horizontal direction—in this case two degrees of elevation taken with a spirit-level quadrant—and then to fire with various charges of powder, noting the spots at which the shots first graze, and the time, in seconds, from the discharge in which they do so. The rest of the flight of the missiles in their ricochets, is only incidentally noted. The object is not to hit the target, but to find out the distances certain charges will project shots of the same weight, and the amount of deflection those shots experience, and the velocities they attain in their flight.

"The first seven rounds were with the American mammoth powder, a very coarse but strong powder, the individual grains being as large as horse-beans, and roughly angular like the coarser flint gravel met with just below our sea beaches. The velocity in all the following cases was taken at 50 yards from the gun:

"Round No. 1:—Charge, 35 pounds; weight of shot 452 pounds 12 ounces; recoil of gun carriage, 5 feet; time of flight to first graze, 2·7 seconds; distance of range to first graze, 696 yards; deflection of shot to the right, 1·6 yards.

"Frame of screen cut by shot, and velocity consequently not obtained.

"Round No. 2:—Charge 35 pounds; shot, 451 pounds; recoil, 4 feet 11 inches; flight, 2·5 seconds; range, 740 yards; deflection, right, 0·6 yards; velocity, 917 feet per second.

"Round No. 3:—Charge, 35 pounds; shot, 455 pounds; recoil, 5 feet; flight, 2·7 seconds; range, 737 yards; deflection, right, 0.6 yards; velocity, 926 feet per second.

"Round No. 4:—Charge, 50 pounds; shot, 453 pounds 4 ounces; recoil, 8 feet 5 inches; flight, 3 seconds; range, 963 yards; deflection, right, 2·8 yards; velocity, 1,110 feet per second.

"Round No. 5:—Charge, 50 pounds; shot, 454 pounds; recoil, 8 feet 7 inches; flight, 3 seconds; range, 1,003 yards; deflection, right, 2 yards; velocity, 1,120 feet per second.

"Round No. 6:—Charge, 50 pounds; shot, 453 pounds 8 ounces; recoil, 8 feet 9 inches; flight, 3 seconds; range, 987 yards; deflection, right, 3·2 yards; velocity, 1,133 feet per second.

"Round No. 7:—Charge, 60 pounds; shot, 453 pounds 4 ounces; recoil, 10 feet; flight, 3·3 seconds; range, 1,138 yards; deflection, right, 1·4 yards; velocity, 1,210 feet per second.

"The next six rounds were fired with the English service large-grained rifle powder, the grains of which are far smaller than the American, and in appearance much like very fine coal dust. The combustion is also much more sensitive, and the powder stronger: roughly, probably, in the proportion of 40 pounds to 50 pounds.

"Round No. 8:—Charge, 35 pounds; shot, 450 pounds 12 ounces; recoil, 6 feet 4 inches; flight, 3 seconds; range, 879 yards; deflection, 1·6 yards; velocity, 1,037 feet per second.

"Round No. 9:—Charge 35 pounds; shot, 452 pounds 8 ounces; recoil, 6 feet 7 inches; flight, 2·8 seconds; range, 880 yards; in line true; velocity, 1,044 feet per second.

"Round No. 10:—Charge 35 pounds; shot, 450 pounds; recoil, 6 feet 5 inches; flight, 2·9 seconds; range, 873 yards; deflection, 1 yard left; velocity, 1,010 feet per second.

"Round No. 11:—Charge, 50 pounds; shot, 453 pounds; recoil, 9 feet 4 inches; flight, 3·1 seconds; range, 1,023 yards; in line, hit the target near the center; velocity, 1,191 feet per second.

"Round No. 12:—Charge, 50 pounds; shot, 451 pounds 8 ounces; recoil, 9 feet 9 inches; flight, 3·2 seconds; range, 1,073 yards; deflection 2·2 left; velocity, 1,211 feet per second.

"Round No. 13:—Charge, 50 pounds; shot, 451 pounds 8 ounces; recoil, 9 feet 10 inches; flight, 3·2 seconds; range, 1,140 yards; deflection, 2·4 yards left; velocity, 1,214 feet per second.

"The two concluding rounds were fired with American mammoth powder.

"Round No. 14:—Charge, 60 pounds; shot, 451 pounds 8 ounces; recoil, 9 feet 10 inches; flight, 3·1 seconds; range, 1,012 yards; in line, true; velocity, 1,194 feet per second.

"Round No. 15:—Charge, 60 pounds; shot, 452 pounds 8 ounces; recoil, 9 feet 9 inches; flight, 3·1 seconds; range, 1,032 yards; deflection, 2·6 left; velocity, 1,210 feet per second.

"The alteration from right to left deflection was possibly caused by a change in the direction of the wind.

"We cannot in this notice enter into detailed comparisons between the performances of our own heavy rifled guns and this American cannon; but we may briefly add that the battering charge of our 9-inch Woolwich muzzle-loader is 43 lbs. L. G. R. powder, and the ordinary service charge, 35 lbs. The weight of the 9-inch rifle shot, 250 lbs.

"The American Rodman has thrown its shot very true and a very long distance. It was a pretty sight to see the dark ball rebounding from the mirror-like sea, dashing up a round cloud of spray at each ricochet, until, at last, in the far distance, out among the gray, hazy ships, a faint, continuous white mist streaked for many seconds the surface of the water, and the thud, thud of the rebounds of the shot died away in a pulsating noise like the distant puffing of a railway train."

By reference to our reports of the trials of the fifteen-inch gun, against iron-faced granite targets, at Fortress Monroe, in September last, published in Vol. XV., Nos. 15 and 16, it will be seen that this piece tested at Shoeburyness maintained its character for initial velocity. In the former case, with a charge of 55 lbs. of mammoth powder, and a shot of 432 lbs., its velocity was 1,155 feet per second: in the latter case, with 60 lbs. of the same powder and a shot weighing, in three trials 453 lbs. 4 oz., 451 lbs. 8 oz., and 452 lbs. 8 oz., the velocity was respectively 1,210, 1,194, and 1,210 feet per second. From these trials, compared with those of the English guns, it is evident that the English wrought-iron rifled guns are not only inferior in weight to our fifteen-inch smooth-bore, but inferior in initial velocity, and consequently in range; that they do not equal them in penetration or perforation we believe can be proved to the satisfaction, even of the English, by competitive trials of both at Shoeburyness against the same targets.

The English authorities have been unwilling to believe our statements as to the efficiency of our fifteen inch guns, although they were tested repeatedly, in our late war, against the sides of powerful iron-clads, and as for the twenty-inch gun they merely regard it with either well-assumed contempt or insincere ridicule. Possibly it has not yet been subjected to a sufficiently satisfactory test, even for us, but we have as much faith in its endurance and its power of penetration and range as we have in those qualities of its lesser cousin, which have been repeatedly tested. Indeed, we are ready to join with the *Army and Navy Journal* in not only believing in the possibility, but urging the practicability of casting guns on the Rodman principle, which shall throw shot and shell of twenty-five inches diameter. Such a gun, if constructed, would smash the heaviest wall of masonry of any existing forts, and destroy any iron clad that ever floated. We doubt if any floating battery in existence could withstand the inertia even of our twenty inch shot.

Nor does it seem we lag behind in the perfection of fire-arms for the infantry and cavalry arms of the service. Of course the intention of all improvement and all invention in this direction, is to construct a perfect breech-loader. Although during the late war, regiments of cavalry and infantry were armed with improved pieces loading at the breech, as the Burnside, Sharps, Spencer, etc., the Government was employing private establishments, in various parts of the country, in the manufacture of muzzle-loading rifles, up to the close, or nearly so, of the war. It was known, that in the first engagement of any magnitude—the first Bull Run—Burnside's division was greatly assisted by the Sharps' rifles of eight companies of the Second Connecticut Infantry, yet two years after that, if not later, the Colt's Company, in Hartford, and other contractors, were busy in filling government orders for the Springfield muzzle-loading rifle. In consequence, there is now in the country not less than one million of muzzle-loading muskets and rifles. Of course, the grand object at present is to "convert" these comparatively inefficient arms into superior weapons. New York State has about forty thousand Springfield muskets which it is proposed to convert. A State Ordnance Board is holding sessions in New York City for the purpose of examining and testing the various plans which may be laid before them. Quite a number of different plans have already been submitted, many of them quite ingenious and apparently promising. We forbear any detailed report at present.

The United States Government has already adopted a plan for converting, which has not only the approval of the Secretary of War and eminent ordnance officers, but has been examined by commissions or individual officers of various European governments, who, without an exception, agree that the converted piece excels the Prussian needle gun, the French Chassepot rifle, or any other with which they are acquainted.

It is known as the "Allin Patent," and a large number of workmen are now employed at the Springfield Armory in converting our muzzle-loaders into this breech-loading piece. A correspondent of the *World* thus describes the transformation:—

"The object is to reduce the calibre of the old muskets in order to admit of the use of a smaller cartridge, and thus secure greater range and force; that important point has been accomplished by reinforcing the barrel, that is putting in a thin lining or sleeve, which delicate operation is effected with admirable precision and rapidity. The old rifling is first reamed out, leaving a perfectly smooth bore. The lining is then inserted and brazed so as to become practically a part of the original. This new interior is then rifled with a shorter twist than before, being reduced to one turn in forty inches, while the calibre is reduced by the lining from 58·100 to 50·100 of an inch.

"The breech-loading apparatus of the Allin gun is almost as simple as an ordinary muzzle-loading musket. It consists merely of a slot cut into the top of the barrel, serving as a cartridge chamber, which is covered by a breech-block, swinging on a hinge at the lower end. The same block and hammer are used. There is nothing complicated or puzzling about the weapon. The clumsiest soldier can handle it easily. It has been fired twenty times a minute, and one has been discharged several thousand times without perceptibly affecting its efficiency, even after having been exposed for weeks at a time to the snow and rain of last winter. Its weight, complete, is about nine and a half pounds; owing to the improved rifling and reduced calibre obtained by the reinforcement above described, it has a surprising range and accuracy: and, to conclude, it is "finished up" to the highest degree of perfection, every part (of which, by the way, there are only nineteen all told,) bearing the minutest inspection for its beauty and strength of construction and the admirable finish of the minutest particular. Some thousands of these burnished breech-loaders, ranged in their racks, are a sight to captivate the heart of any expert in gun science. These guns are now being used in our Indian war in the far West, and the soldiers speak in the highest terms of them. The Cranston central-fire copper cartridge, on a new principle, (the "anvil" of the cartridge being loaded,) is now being tested at the armory for the new breech-loader. Hitherto the Martin cartridge has been used, but the Cranston proves a formidable if not fatal rival."

A Mountain Railway.

When the British government determined to construct a net-work of railways throughout India, considerable discussion took place as to the best means of connecting Bombay with Calcutta and Madras, for, as there was no break in the Western Ghauts, the idea of constructing a railway across them seemed utterly impossible. However, surveys were made, and at length it was determined to build the railway as it now exists; that is, run from Bombay to Callian, a distance of thirty miles inland,and there it forks into two branches, one going north-east to Agra, where it joins the East Indian railway leading from Agra to Calcutta, and the other going in a south-easterly direction towards Poona and Madras. The first of these crosses the Thell Ghaut—a mountain rising 1,912 feet above the level of the sea—and the latter crosses another mountain called the Bhore Ghaut, which rises to the height of 2,037 feet above the sea. The difficulties which the engineers encountered in the construction of this work were something stupendous; but as most of the ground over which the line passes is now cleared of jungle and leveled, and the all-but inaccessible mountain scarps, along which the track has been laid, have been well nigh obliterated, the obstacles in many places are scarcely apparent.

The Bhore Ghaut incline, which is the larger of the two mountain ways, is fifteen miles and sixty-eight chains long

The level of its base is 196 feet above high water mark at Bombay, and of its summit 2,027 feet; so that the total elevation of the incline is 1,831 feet. Its average gradient is one in forty-eight; its least one in three hundred and thirty, and its steepest, one in thirty-seven Throughout its length are twenty-six tunnels, ranging fron,forty-nine to 437 yards long, and forming a total length of 3,985 yards, or two and a half miles. There are eight viaducts, most of which consist of arches of 50 feet span, varying in length from 52 yards to 168 yards, and from 45 feet to 139 feet high; so that the total length amounts to fully half a mile.

The total quantity of cuttings amount to 1,623,102 cubic yards, and the embankments to 1,849,834 cubic yards, the greatest depth of cutting being 80 feet, and the maximum hight of the largest embankment being 74 feet. Besides this there are eighteen bridges of various spans, from seven to thirty feet, and fifty-eight culverts, of from two to six feet span, the cost of the incline was £597,223, or £41,188 a mile; or in other words about $3,000,000. The works were commenced in 1855, and were finished about five years afterwards.

It is obvious that to make a train laden with freight or full of human beings, ascend a gradient of upward of eighteen hundred feet must require extraordinary locomotive power. Accordingly, when an ordinary passenger train approaches a station at the foot of the Ghauts, it is divided into two sections, and generally two exceedingly powerful engines are attached to pull, and a third to push each section up the ascent. Powerful brake vans are also attached, so that in case of accidents the train may be stopped and prevented from receding down the slope. In descending the Ghauts, similar precautions are taken to prevent the trains from going too fast, and fewer locomotives and more brakes are dispatched with each train. Even then it requires the utmost caution to prevent the trains getting too much headway, lest it run off the rails and be dashed to pieces over some of the yawning chasms with which the mountains abound.

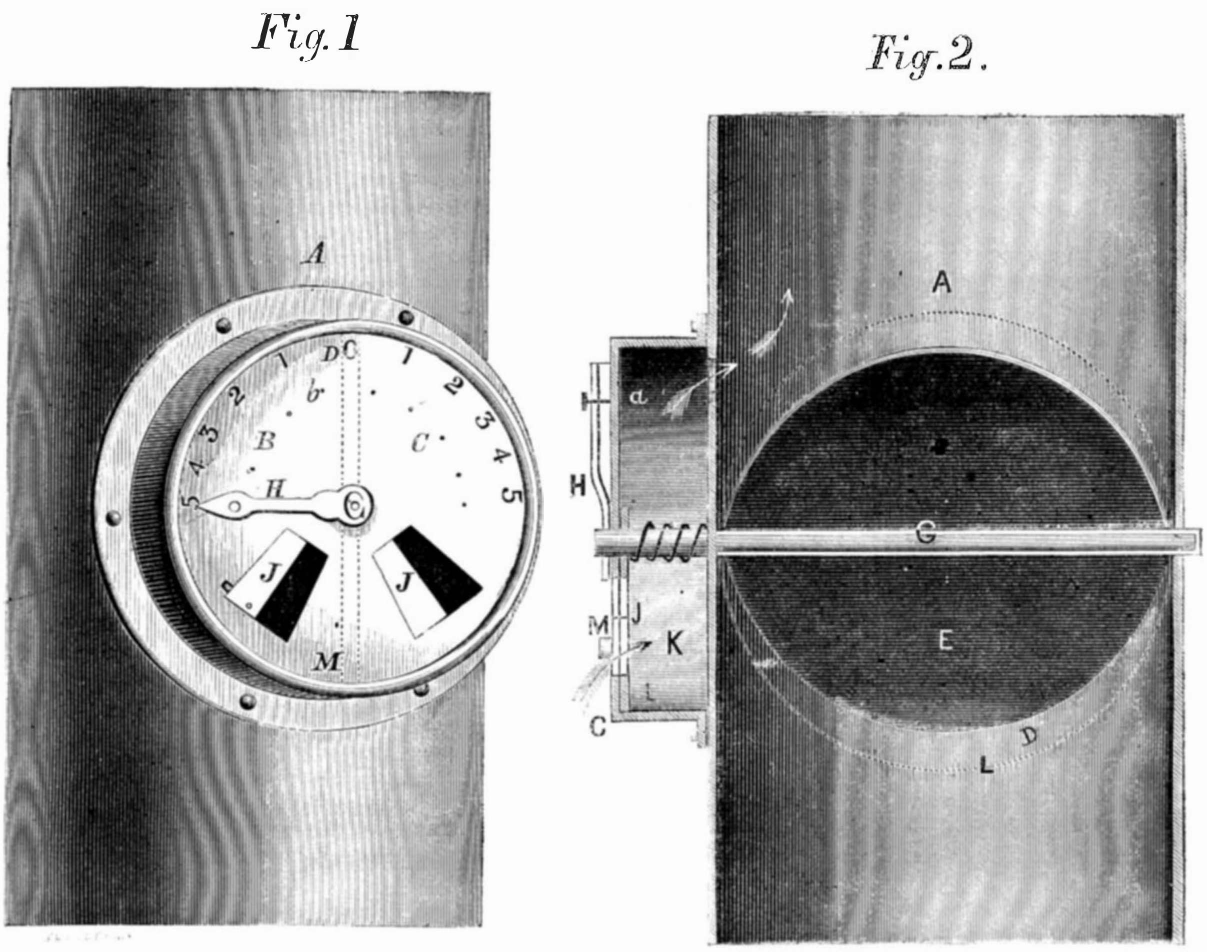
A terrible accident of this kind occurred in 1865. A heavy goods-train started from the top of the incline early one morning. It went on all right until it got to a steep portion of the line, where the guards and brakemen should have applied the breaks. They neglected to do so: the train acquired accelerated speed with every foot of space it traversed; the driver shut off steam and reversed his engine; the brakesman applied the brakes with all their might, and some of the men at the risk of their lives actually jumped off and tried to put lumps of wood between the spokes of the wheels. But all efforts were unavailing. The momentum increased. The train rushed down the descent with terrific velocity. It dashed past the reversing station with a whirl and a rush, and plunged over the precipice beyond. Its motion was so swift that, enveloped in the dense cloud of dust which it raised, it was not seen by the inmates of the solitary station past which it swept; and but for the remarkable noise which it made, the accident would have remained unknown. Search was made, and the train and its freight were found smashed to pieces at the bottom of the precipice, and the poor men who had charge of it crushed to death beneath its ruins. —*Cin. Com. Journal.*

Improved Device for Regulating Funnel Drafts.

The object of this invention is to furnish a much needed improvement in an article of general utility: the regulating and adjusting the draft in stoves without—as is the case with close fitting dampers when closed, forcing the gases and smoke from the stove into the room—and for a greater economy in the combustion of fuel, as it will save from 20 to 25 per cent of coal and from 30 to 40 per cent of wood. It not only prevents the leaking of gases from the stove, but provides a means of escape for them, and for all impure air from rooms. The engravings represent the advantages of this invention.

Fig. 1, section of pipe, A, with dial box, B, attached; Fig. 2, sectional view of pipe and box. Attached to damper spindle, G, is a hand or pointer, H, with knob, and pointed stud on under side, to hold the damper at any graduation from 0 to 5 by indentations, b, in the face opposite the figures, graduating the draft in the stove accordingly. When the hand points to 0 the damper is at right angles with pipe or closed; when it points to 5 it is open. See dotted lines, M, Fig. 1. E in Fig. 2 is the damper, which is simply a thin disk of cast iron, oval in form, parallel with spindle G. Openings J, J, in dial face below, with corresponding openings in pipe above the damper, are for the purpose of admitting air from the room into the pipe, (arrows in Fig. 2 indicate air,) operating with the damper to increase or decrease the ascent of gases in the pipe, affecting the combustion of fuel in the stove. These openings also provide a means of ventilation. Inside dial box, B, is a revolving disk, L, with duplicate slots, J. J., by which the air passage may be opened or closed as desired. D, in Fig. 2, is the space between inside of the pipe and damper when closed, for the escape of gases and smoke, as a total interception should never be allowed. All draft obtained consequent upon this space can be controlled by the admission of cold air through the openings, J, J.

It is simple and can be attached to any pipe. Patented through the Scientific American Patent Agency, April 16, 1867. Further particulars and information regarding rights, etc, can be obtained by addressing Bullard & Co. Geneva, Ontario Co., N. Y. Circular of information furnished on application.



BULLARD'S DIAL ATTACHMENT FOR STOVEPIPES.

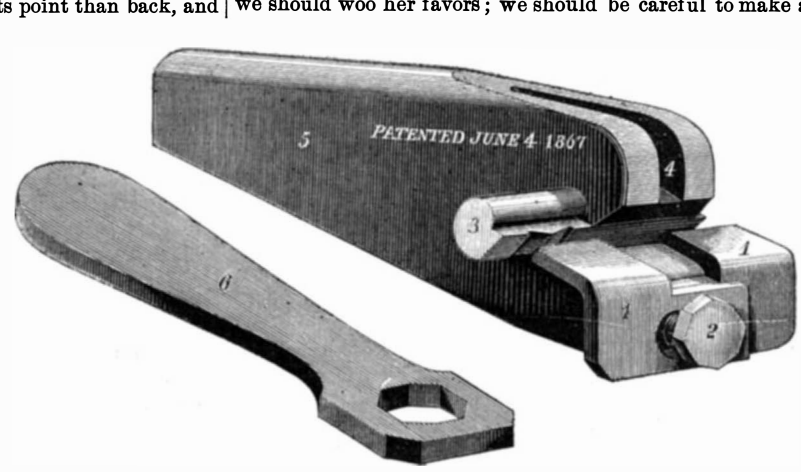
Improved Swage for Saw Teeth.

The setting of circular saw teeth has almost entirely gone into disuse and the swaging or spreading of the edge succeeded it. The result is very much favorable to the action of the saw, as each tooth is wider on its point than back, and thus chisels a kerf to admit the passage of the saw without that alternate strain unavoidable when the teeth are set.

The engraving represents a late improvement upon the swage patented last year by the inventor. The object accomplished by this tool is the spreading and sharpening the teeth of circular and upright saws, and giving them the most perfect shape for cutting lumber. The movable lips, 1, 1, are so made as to form the tooth widest at the extreme point and on the under side. They are secured by the screw, 2, after being adjusted to allow the saw tooth to spread to the desired width. The pin, 3, fits tightly in the body of the swage, 5, but can be driven by a slight blow of the hammer, so that either the V-die or the flat part of the pin can be brought between the movable lips. The groove, 4, is made to admit of the swage being used on a fine-toothed saw. 6 is the wrench for screw, 2.

In using this tool the top of the tooth is placed between the movable lips, and a few light blows are given with the hammer on the end of the swage. The face of the pin and the inside face of the swage being tempered very hard, together form the edge of the tooth, while the movable lips, also tempered hard, form the corners cf the tooth and determine its width. The V-die is first used on a new tooth, as the spread is more easily started with it, but the tooth is finished with the flat part of the pin between the lips. The head of the swage is tempered to prevent its being battered with the hammer. Two sizes are manufactured, the smaller for very fine toothed saws exclusively.

For further information address American Saw Company No. 2 Jacob street, New York City.



EMERSON'S ADJUSTABLE SWAGE.

How to Sleep.

Dr. Joseph Wait, of Natick, R. I., has written a very sensible article on the above subject which we transfer to these columns from the *California Farmer*:—Sleep is the natural restorative of the wasted energies of the human system. It is during sleep that the processes of assimilating the food and nutrifying the tissues are thoroughly carried on and perfected, and that the nervous system is built up and invigorated. He who is a good sleeper, habitually enjoying quiet, refreshing, and unbroken sleep of seven or eight hours every night, can scarcely fail to have good health; while he whose sleep is disturbed and broken from any cause, who is restless and unquiet, and who fails to find himself in the morning refreshed and reinstated in tone and energy,—however favorable his other conditions may be,—cannot be a well person; or if he has health he is in a sure state to lose it. So potent is sleep as a means of restoring strength to the nervous and muscular systems, that the judicious physician—of whatever school,—values it above all other physical agencies as a curative in disease. However much the doctor may think of his medicines, he will suffer his patient to pass them all by so long as he can sleep!

Healthful, refreshing, sleep therefore, should be duly valued by all who wish to have sound health. We cannot afford to be indifferent whether "tired nature's sweet restorer" visits our pillows favorably or not. We must be very hospitable to her; we should be at great pains to entertain her; we should woo her favors; we should be careful to make all the circumstances and surroundings agreeable to her requirements; then she will not show herself a moody, fickle or unreliable guest, but will make herself at home with us, and wrap us nightly in her soft embrace, till fresh life and vigor are infused into us.

There are other ways of "murdering sleep" than by guilty conscience, like Macbeth. One of the most effectual is practiced alike by men and women—which is the habit of carrying their business, whatever it may be, to bed with them. The merchant is absorbed in his mercantile affairs from morning till evening, and, when he closes his store at night, he does not close his business, shutting the affairs of the day out of his mind and occupying it with other thoughts which shall prove a diversion and relief, but he allows himself to study, and plan, and calculate about the special matters which have occupied him during the day. He goes to bed with his head full of business: when he sleeps his brain is burdened with it; he wakes, and turns, and dozes, and turns again. Business haunts him like a night-mare. He awakes in the morning unrefreshed and enervated, having performed as much business by night as by day.

The lawyer suffers his business to occupy his mind clear up to the time of retiring; and then when he would put it away he cannot, but it flits about his bed-head, whispering first in this ear, then in that; startling sleep from him whenever she would settle upon him with her downy pinions.

The minister studies his sermon far into the night, and then goes to bed and sermonizes during the remainder of the night, and rises in the morning weary and worn,

The student pores over his lessons till midnight, then goes to his couch with a brain excited and active; and so can get no continuous, undisturbed repose.

Women who have husbands and children and houses to care for, work, and calculate, and plan till the management of their households and servants comes to absorb all their thoughts and life, till they keep house at night between the intervals of fitful sleep, as well as during the day. Teachers carry their schools to bed with them and expend their sleeping as well as their waking energies upon them.

In order to secure such repose of the mind and the body as shall reinvigorate them, it is essential that the thoughts be turned out of the channel in which they have run during the day. They must be effectually diverted from their course. Thus the action of the nervous system is modified, the circulation of the blood is changed, and a sedative condition is secured.

There is a real philosophy in the practice of devoting the evening to amusements. Legitimately regulated and intelligently appropriated, they would for the time absorb the attention, thoroughly breaking up the action of the mental faculties, and so be the most fitting preparation for healthful sleep.

By amusements and recreations, by social intercourse, or by conversation, pleasant or gay; by reading something which shall not task the mind, while at the same time it diverts it with new thought; by light and pleasant physical exercise in the open air—not in gymnasiums—or by some other means should all persons, whose minds are burdened with cares or study, relieve the pressure before retiring at night.

The housekeeper may walk in the fields, and listen to the birds and pluck flowers, or cultivate and train flowers in her garden, or have a romp with her children; being sure for the time to become herself a child, and forget the duties of the day. She may seek to divert her thought by chatting with her neighbor; only let her be sure not to chat upon household affairs, and not to allude to her trials in the management of her children, nor to her difficulties with her servants, nor to her hardships in her labor.

One of the greatest mistakes which people make, so far as cultivation and expansion of the mind are concerned, not mentioning sleep, is always to make their conversation relate to their particular work or profession. Mothers are prone to be continually talking about their children, or domestic affairs; teachers about teaching; farmers about their farming business; lawyers about the law, etc. Every person, however much necessity may cause him to be devoted to business during the day, should so command his resources and surrounding, that before going to his couch at night, he shall be emptied of his farm, store, office, study, household work, teaching, and be simply a human being, lovingly related to God and to all men. Then, if his stomach has not work on hand, his sleep will be sweet and refreshing, and one of the surest preventives of sickness he can possibly have.

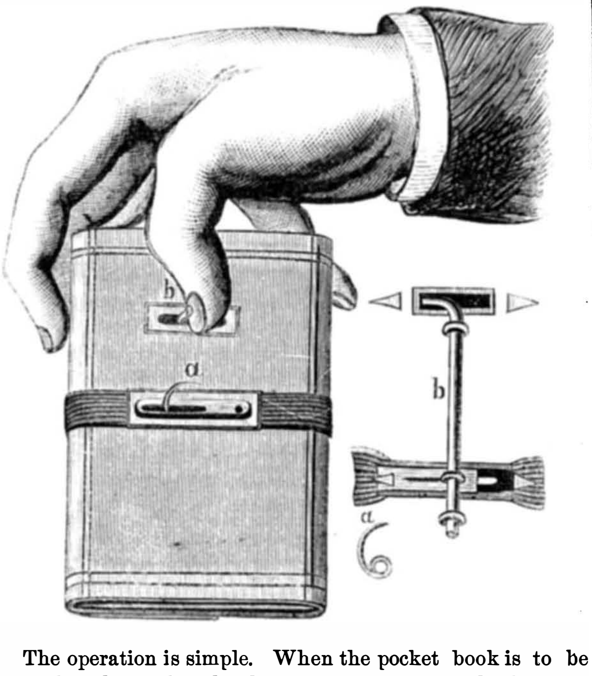
American Oils at the Paris Exposition.

Notwithstanding the many flings at the slimness of the American department at the great Exposition, our countrymen have succeeded in bearing away a goodly share of the first prizes. Among the most deserving is the award of a silver medal—the highest in the class—to Mr. F. S. Pease of Buffalo, N. Y., for engine, signal, lard, and petroleum oils. Mr. Pease has long been well known in this country as a manufacturer of superior oils, and it is gratifying to learn that his products are being introduced into France and England, and so far have given perfect satisfaction. Mr. Pease's oils took two prize medals, also, at the World's Fair in London, 1861. These facts sufficiently attest their superiority. He exhibits in Paris about forty different kinds and qualities of oils adapted to every purpose for which oils are used.

A Sensible Strike was made by some coal miners in England recently. They refused to work until certain precautions were taken against accident, which were acknowledged by the proprietors to be essential, but which they did not want to attend to just then.

WEBER'S SAFETY POCKETBOOK.

Not only visitors to our large cities, but the regular inhabitants have frequent cause to deplore the skillfulness of the professional pickpocket, who so adroitly relieves them of their pocket-books, generally without alarm or detection. The engraving, however, shows a very simple means of balking their skill and protecting the citizen's money. Under the clasp, which retains the elastic strap in place, is a curved needle, seen at *a*, which is secured to a wire bar, *b*, in the smaller figure, inside the wallet cover. The other end of the bar is bent at right angles and terminates on the outside of the porte-monnaie in a small knob, which works in a slotted guard, b, in the large figure. The point of the curved needle projects through the central guard at *a*.



The operation is simple. When the pocket book is to be placed in the pocket the thumb presses against the knob, b, and the neeble is turned back until its point is below the surface of its guard; the thumb is then withdrawn, and a spring on the inside of the book cover throws the curved needle forward, engaging with some portion of the pocket or clothing and securing it in a loop. Now, unless the knob is pressed back, the book cannot be removed from the pocket, at least, without alarming its possessor.

This ingenious device was patented April 2, 1867, by Theodore A. Weber, who can be addressed care U. Herrmann & Bro. 159 Pearl street near Wall, New York city.

Correspondence.

The Editors are not responsible for the opinions expressed by their correspondents.

"Running Down" the "Dunderberg."

MESSRS. EDITORS:—When the English journal *Engineering* by error assigned to Captain Ericsson the design of the *Dunderberg*, it was made an occasion to declare this vessel a "weak monstrosity;" when she was sold to France this was made an occasion to impeach her prowess and ridicule her purchasers. The last paper ball fired at this persistently abused vessel was by the *Army and Navy Journal* in its issue of June 29, 1867. If there is then, anything in the tone of the present article seemingly harsh, let it be viewed in the light of those persistent misrepresentations; let it be viewed in the knowledge of persistent efforts to glorify Mr. Ericsson's monitors and defame any ship of any other man. Then to the subject. The *Army and Navy Journal* tells us: "The broadside vessel is a style of iron-clad which we have uniformly pronounced inferior to the turreted monitor. . . . The 9-inch Woolwich rifled gun, a very common gun in England, at moderate range, would certainly penetrate the 3½-inch armor of the *Dunderberg's* casemate, and probably go through both sides into the sea." Now the SCIENTIFIC AMERICAN says, page 173: "The *Dunderberg's* casemate sides and ends are inclined inward for the purpose of 'shedding' the shot fired against it, and plated with armor plates 28 inches wide and 4½ inches thick, extending in one section the entire hight of the casemate." So there seems one inch more of solid iron than the *Journal* gives credit for. Then the *Journal* gets 7 feet of soft timber into the *Dunderberg's* casemate, in order to afford its shells chance for "maximum destruction," when other accounts put the 7 feet of timber as well as the 3½ inches on the vessel's sides proper. Is the *Journal* merely innocently "in error" or "wilfully misrepresenting?"

Further on we quote: "The *Tennessee's* armor was not only much thicker than the *Dunderberg's*, but was backed by more solid timber," etc. The report of Captain Jenkins and others on "Survey of the rebel ram *Tennessee*," of August 13, 1864, says: "The plating at the casemate sides is 5 inches thick, consisting of two 2-inch and one 1-inch plates, about 6 inches wide. The backing was yellow pine, 13 inehes, placed vertically; outside planking of yellow pine, 5½ inches thick, placed horizontally, and outside of this a layer of oak 4 inches thick, bolted on vertically, upon which the plating is secured." In all say 22½ inches mixed timber and 5 inches laminated armor in plates only 6 inches wide.

The *Dunderberg's* casemate has 4½ inches solid hammered plates 28 inches wide (which are certainly equal to the laminated armor of the *Tennessee*), and three courses of timber each one foot thick, say 36 inches of timber (which are certainly a little more than equal to the backing of the *Tennessee*)—so this assertion is "curiously the reverse of the fact."

Then the *Journal* tells of the "15-inch shot fired at the *Tennessee*, instead of being fired at point blank range, was fired at a considerable elevation, and struck not fair and square, but at an acute angle with the casemate, and even at an acute angle with the length of the vessel." Official reports do show that a certain Captain Nicholson, of the *Manhattan*, claimed all sorts of havoc committed by his 15-inch shot, but the survey of Captain Jenkins rectified some of this "fearful" havoc. In 2 hours and 52 minutes the *Manhattan* fired just 11 times, whereas the *Winnebago* fired 56 times in 2 hours and 30 minutes, the *Chicasaw* in about the same time fired 12 times, and the survey aforesaid showed more "fearful havoc" by the 11-inch balls of the *Winnebago* and *Chicasaw* than by the 15-inch balls of the *Manhattan*. Only two 15-inch balls are claimed as effective; one went through the armor, the other indented it (as per Captain Nicholson's report) so that Captain Jenkins and others did not find the indentation, for they do not mention it. Now does not the *Journal* get the two 15-inch balls "mixed"—did not the one that was fired at considerable elevation, at an angle, etc., as stated above, only graze the armor, and was not the ball that went through really fired "fair and square?" It looks too much so to be otherwise.

Then the *Journal* persists: "A single well directed shot, even if it took an hour to fire it, would pierce the *Dunderberg* * * *, while the latter might be firing her guns once a minute, if she liked, for an hour, without being able to enter such monitors as the *Puritan* or *Kalamazoo*." It is proposed to accept these odds. The *Dunderberg* fires for an hour, the *Puritan's* turret has an hour to get jammed (and certain official reports show that it does not take an hour to so get them), the pilot house has an hour to be pounded out of true, and its supporting spindle to be strained so as again to jam the turret; then there is the hour to jam a port stopper—in short, an hour in which any one of the numerously authenticated ills may befall the "rotating turret" which disable the ship. But even at the risk of imputation of cruelty, it is proposed to pour a single well-directed shot into the *Puritan* in the following manner. Aim to strike square about 2½ feet below load water line, if the swell of the sea only once in an hour favorably exposes the side armor of the *Puritan*, then the *Dunderberg's* single well-directed shot meets two 1-inch plates of iron and four feet of wood, and just beyond the boilers! It is not proposed to send the ball entirely through.

The *Dunderberg* carries an armor of 3½ to 4½ inches solid iron on the entire side to a depth of six feet below the water line, placed at an inclination, backed by seven feet of timber; the *Puritan* has laminated iron—six one-inch plates—extending but one foot below the water line, and then receding at the rate of one plate for every six inches of depth, backed by four feet of timber. Which is the better, or to put in other words, which isn't a swindle?

The English *Bellerophon* carries her solid 6-inch plates six feet below load water line, and here is the boasted, puffed monitor fitted with a sham protection that does not need a Woolwich 9-inch gun to "certainly penetrate it." To hold the *Puritan* or any other monitor to be an immaculate conception is an Ericssonian assumption. The interests of John Ericsson, Esq., are not always those of the nation—the *Puritan's* side armor shows it. To boast of the monitors as our accepted "war vessel," is to remain in the past. Happily, republics are ungrateful enough to keep on regardless of individual interests. In our infancy we may have petted these things over much; in our riper day it becomes us to consider that nothing, even nothing is perfect, save the illustrious vanity of certain inventors.

When the little *Monitor* drove back the *Merrimac* we felt gratitude to the great engineer; she was a good ship to fight in. When she buried herself and part of her gallant crew, we buried a part of our gratitude; she was a bad ship to sink in. Every blow that jammed a turret, or strained a spindle, or broke the turning gear, undermined a great Ericssonianism—the rotating principle—and the first design that gives us a vessel strengthened by her turret, not subject to derangement in her battery, not endangered by that ever awkward turret deck joint, the first such design that gives equal offensive prowess of battery, will apply the principle of rotation in office to the rotating principle of the Ericsson turret.

Progress never sleeps, and this country will progress, and in spite of the *Army and Navy Journal* or any of its pet notions.

G. P. HERTHEL, JR.

To Prevent the Ravages of Bolt Eaters.

MESSRS. EDITEURS:—I notice in your valuable paper an answer to inquiry in No. 23, Vol. XVI., of E. W., of Pa., by J. Allen, of Grafton, Ill., how to prevent the bug from destroying his bolting cloths. I have had quite a good deal of trouble from the same cause in my own mill. I first tried to prevent the ravages of the bug by giving light to the chest by putting glass around it and muslin doors; their deeds being evil, I thought they would require darkness. The result was profitable, but not radical. I next procured wire cloth, so fine that those bugs could not get through the meshes, covered a reel, and bolted the chop through this bolt just before entering the silk cloth reel. Thus the bug never gets into the reel; it also prevents any hard substance from injuring the silk cloth. I have a smoothly made barrel at the end of my wire bolt, where I can catch hundreds of them, as they can not crawl out of the barrel. Mr. Allen's plan of running bolts rapidly when empty may be a partial remedy, but when the bug once gets into the reel it is certainly difficult to bolt him out, as he holds tenaciously to the cloth in the vicinity of the rib, and at that point bores through to release himself from prison. I hold to the doctrine most emphatically that an ounce of prevention is worth more than a pound of cure.

If E. W. will come to Miamisburg he can see my arrangement, which I know is effectual, in an old mill where any quantity of bugs are hatched, besides seeing one of the prettiest countries in the United States, with a harvest unsurpassed in quality and good in quantity in wheat, rye, oats, and flax, abundance of all kinds of fruit, with a good prospect for corn and tobacco.

JACOB SHUEY.

Miamisburg, Ohio.

The Mechanical Question.

MESSRS. EDITORS:—In reading the "mechanical question" of your correspondent H. H., page 50, I am at a loss which most to marvel at, the complacency of your contributor, who seems to be both imperfectly acquainted with the rules of simple arithmetic and profoundly ignorant of the nature of the mechanical laws he professes to manifest such contempt for under the name of "theory," or the superficial nature of your reply. His statement is briefly this:—Take an inclined plane having a length of 4 feet and a hight of 4½ inches (or else a base of 4 feet and same altitude; it is difficult to make out which he means, but the result would not be materially different), then 100 pounds resting on the plane can be balanced by 8⅝ pounds power. He speaks of "occular demonstration." The thing is simply absurd. The testimony of individuals, or crude and careless experiments, can have no weight with any intelligent mind against that of absolute laws. He may indeed place his inclined plane upon a rickety table not beveled up, and imagine he has a rise of 4½ inches when the actual lift may be perhaps 2 or 3 inches. But accuracy is as necessary in conducting "practical experiments" as in working problems, and he who fails in the latter and treats arithmetic with contempt may well be suspected in his attempts at the former. I give the problem, (l being length; h, hight of plane; P, power, and W, weight). $\frac{P}{W}=\frac{h}{l}\therefore$ $P=\frac{Wh}{l}=\frac{100\times4{\cdot}5}{48}=9\tfrac{3}{8}$ pounds (or in case 4 feet represents the base of his plane, $\frac{100\times4{\cdot}5}{48{\cdot}21}=9{\cdot}334$ pounds). To move the weight would require considerably more, of course—experiments to the contrary notwithstanding. Let me add that the laws of mechanics were first deduced from multitudes of careful and accurate experiments—not from theories, which on the contrary were against them, as Galileo found to his cost while verifying this very principle of the inclined plane.

Washington, D. C. H. H.

Siberian Marmots.

MESSRS. EDITORS.—In your Scientific Magazine of the 27th April there was a rceipe to destroy rats by injecting into their haunts sulphuret of carbon in vapor. We have here an immense quantity of little animals about the size of rats which live in the ground, they lie dormant all winter very deep in their holes and in the summer they are destructive to the grain crops, particularly wheat, they are called "siberian marmots." Would some of your correspondents be kind enough to tell us how they can be destroyed? If by vapor from what the vapor is produced, and by what means it can be injected into the ground as their runs are very extensive running out of one into another for a great distance and for about three feet from the surface perpendicularly.

WM. COWLEY.

6/18 June, 1867. Nicholas Plain, Kharkoff, Little Russia.

[The marmot belongs to the squirrel family; the American wood chuck and gopher are varieties which closely resemble in their habits the European marmot. If the outlets of the holes are guarded, it seems very likely that a good dose of bisulphide of carbon would destroy the pest. Bi-sulphide of carbon is a very volatile liquid, and if it were poured into the marmot holes, its heavy vapor would immediately penetrate into all their ramifications.

Our readers will observe the peculiar method of expressing the date of the letter. The Russians still adhering to the unreformed calender or old style are twelve days in advance of our reckoning. Our 6th of June was their 18th. Little Russia is one of the departments of Russia in Europe and Kharkoff is a province.—EDS.

Mysterious Boiler Explosions.

MESSRS. EDITORS:—There have been three mysterious boiler explosions in this city within two or three years, all in the same mill. First, that of a four-flued boiler, which had been in use two or three years, when one of the owners passed through the engine room a few minutes before the explosion, and noticed the water running out of a leaky gage, and believed there was plenty of water in the boilers.

They then put in two double-flued boilers, with glass water gage in addition to the usual gages; water connection in the form of a large mud receiver, with large pipes from the boilers down to the mud receiver. It ran about a year and blew up, killing the engineer, so there was no evidence in regard to the state of the water, but it is supposed that with the glass water gage he could not very well be deceived.

The mill was rebuilt, with two more boilers, water connections the same as before. The steam connection was the pipe for conveying steam to the engine. In both the last explosions the boilers next the brick smoke stack were blown to pieces, while those next the engine remained whole, except the damage caused by being thrown out of the building. The engineer says that by the indicator he had between 45 and 50 pounds. It had been higher but it was working down. He tried the water and found it well up; stepped out to get a drink and away it all went.

Many suppose that some peculiarity of the water causes it, there being indications of oil or something of the sort near by, where they are boring for oil. But if this is so, why should not other boilers in the vicinity be troubled in the same way?

There were no water gages in the boiler next to the chimney; the breeching that conveyed the smoke from the flues to the stack, running into the chimney not very high above the boilers. If the breeching was not very large, would not the boiler nearest the chimney have the strongest draft through its flues, consequently make steam the fastest, while the engine, through a small pipe, was drawing off steam as fast from the boiler nearest to it as from the other? Would not the boiler with the best draft make most steam and push the the water down through the large water pipes up into the the other boiler faster than a small steam pipe connection could equalize the pressure, at a time when the engine was drawing its steam through this pipe, thereby causing the boiler nearest the engine to show water at its gages, while but little water remained in the boiler nearest the chimney? If this is so, would not large steam connections (steam drum for instance), remedy it? Or running the breeching perpendicular for a distance before turning into the chimney so as to equalize the draft, be a remedy? C. G.

Beardstown, Ill.

[This may be a series of "mysterious" explosions, but we are inclined to think otherwise. The only mystery is that the explosions did not follow one another more rapidly. It seems strange that any competent engineer should arrange boilers in the way described. If we had full data, such as the size of the boilers, amount of grate surface, area of breeching, and area and hight of chimney, size and length of steam pipe, size and speed of piston, we think we could show conclusively the cause to have been the water leaving one boiler for the other; at least such is our present opinion. An expert examining the exploded boilers could have determined, probably whether there had been a lack of water or not.

The boiler next the engine would naturally have the greatest draft of steam from it, especially if the common pipe was small. The boiler next the chimney would have the best draft unless the breeching was large; hence, a greater pressure upon it. It would require but half a pound difference in pressure to change the level of the water nearly one foot, which would leave the flues bare.

Water connections should always be arranged with checks, so that the water could enter but not leave the boiler; this is a cardinal point. No boiler should be without gage cocks, glass gages, and low water indicator and reporter. Had there been a good low water reporter attached to these boilers these accidents would not, in all probability, have occurred. The mud receptacles should have been independent, having each no connection with the neighboring boiler. It would be well to run partitions in the breech or conveyer to the chimney from one boiler to another to equalize the force of the draft. —Eds.]

A Question.

Messrs. Editors:—Suppose a chain composed of three links, the whole outside-to-outside measure of which is twenty inches, the links being made of 1¼-inch-diameter round iron, and a single link made of the same size iron and having the same length as the chain made of three links. Would the single link be as strong to resist the strain of a train of cars stretching up as the three links? If not, why?

If there is any difference in favor of the three links then I think it would have to be the result of the six ends each springing a little or being more elastic than the two ends of the single link? But again, unless very carefully made, there are more chances of tearing or breaking one in three welds than a single weld. If the single link is not as strong, made of the same iron, how much heavier ought it to be made to be as strong? Wm. Weiles.

New York City.

An Invention Wanted.

Messrs. Editors:—One article which is of more importance to the laboring people of the United States than any other, would be a neat wooden shoe with a flexible sole. It ought, it can be invented. It now costs from ten to twelve dollars per year for each laborer's shoes; two pairs of wooden shoes, or $2½ per year ought to shoe our laborers. H. E. L.

New Jersey.

VALUE OF ADVERTISING---ITS IMPORTANCE, AND HOW TO DO IT.

In establishing a new business, advertising is indispensable to success. To increase or keep up an already established business, money cannot be so well expended as in judicious advertising. It is important to select mediums for advertising where the circulation is to be among the class of readers most likely to patronize the article offered for sale, and it is cheapest to advertise in papers of the largest circulation.

The Scientific American has a weekly circulation of over 32,000, which is probably more than ten times greater than that of any other publication of its kind in this country, and four times greater than the aggregate number of all similar publications, both weekly and monthly, issued on this continent.

As an advertising medium for the sale or purchase of machinery, patents, water powers, proposals for construction of bridges, situations for engineers, draftsmen, etc., we believe that the Scientific American is unequaled, and that the advertiser will derive a larger profit for the amount disbursed, by making his wants known through the advertising pages of this paper, than in any other way.

Messrs. Witherby, Rugg & Richardson, manufacturers of wood-working machinery, whose advertisement may always be found in our columns, add the following postscript to their last letter to this office:

"We consider your valuable paper worth to us more than all other sources of advertising."

This is a specimen of the expressions of appreciation we are receiving daily from all parts of the country.

Editorial Summary.

Effect of Lightning on Wires.—When the electric fluid is passed through a wire, undulations of the latter are produced, and the wire is momentarily shortened. This shortening was first observed by Nairne, but no satisfactory explanation of the phenomenon has ever been given. In a paper addressed to the Academy of Sciences by M, F P. Leroux the subject is examined anew. Operating on wires left entirely free at their nether extremities, the undulations were quite apparent, but their order was so irregular, and they assumed such a variety of shapes that no rule conld be laid down regarding them, but M. Leroux observed that the temperature caused by successive electrical discharges was not without influence upon them, and he concluded that the phenomenon alluded to involves in its explanation no new principle, and is simply a question of temperature. As the heat engendered by the discharges increases, the wire tends to expand in length by dilation, but simultaneously and from the same cause there is a tendency to increase in diameter, and it is to this double molecular action the undulations must be ascribed.

Encouraging, Very.—J. R. Glover writes to the New York Farmer's Club, that he has been so engaged in his experiments in hatching eggs artificially that he has not had his clothes off more than two and a half hours in any of the twenty-four for the last three months. The results of his persevering labors he sums up as follows: "I have used about 1,600 eggs, and I have now on hand, in good condition, sixteen chickens—just one chicken to one hundred eggs." Still he believes the thing can be done, if we only knew how.

The female skull, according to Weckler, is smaller than that of man, both as regards horizontal circumference and internal capacity, and the weight of the brain is correspondingly less. It may be said that the type of the female skull approaches in many respects that of the infant, and in a still greater degree that of the lower races. With this is connected the remarkable fact that the difference between the sexes, as regards the cavity of the skull, increases with the development of the race, so that the male European excels the female much more than the negro does the negress.

Miners' Lamps.—Notwithstanding that every English miner who is detected in unlocking his safety lamp is liable by law to three months imprisonment, the offence is committed with impunity by means of false keys. A simple plan has been invented by a manufacturer of these lamps for sealing them without using any lock. When the staple has been put down over the eye a small leaden pin is inserted in the latter, then being placed under a horizontal press fitted with two dies, the shank of the plug is formed into a head and both heads are impressed by the dies with any lettering or device.

Life and Death.—It has been estimated that the number of deaths per year throughout the world is about thirty-two millions. Assuming this to be correct, the deaths each day would be about 88,000; 3,600 per hour, 60 per minute, and thus every second carries one human being into eternity. A calculation of the annual births on the globe shows that whereas 60 persons die per minute, 70 children are born, and thus the increase of the population is kept up.

A Huge Laundry is established in the suburbs of Paris at which is washed the soiled clothing of the guests of the principal hotels, at the rate of 40,000 pieces a day. The clothing is boiled with soap and soda, and then washed in hollow wheels, rinsed, partially dried by centrifugal machines, and for the rest in hot-air ovens, which carry off nearly three pounds of moisture per pound of coal burned, and is finally ironed between polished rollers, and then packed ready for return to Paris.

A Mammoth Cave in southern Illinois is reported to rival the famous Kentucky cave and to exceed in length any others yet discovered. It has been partially explored a distance of three miles, but a thorough search through it has never been instituted. Some years since two men got lost in its passages, and after three days of unceasing travel emerged into the open air thirteen miles distant from the place where they entered.

The American Poultry Association recently organized in this city is instituted to encourage the raising of poultry on a larger scale than has heretofore been attempted in the United States. They propose by statistics and by the practice of individual members, to show that poultry is a source of wealth, and that the raising of poultry may be combined with many other branches of farming industry. This will encourage at some future time the formation of large poultry establishments, such as have been erected at Bromley (Kent, England), and in the environs of Paris.

New Zealand Flax.—Interesting samples of paper made from this fiber have been forwarded to England. While rather highly colored, the flax paper has a singularity of texture and a strength which suggests an excellent paper for bank notes. The coloring matter has been removed by chemical means, leaving the pulp as white as that of ordinary cotton rags.

Walrussian Wealth.—Reports of gold deposits in our new Russian Possessions are still coming in. The latest is contained in a letter to Secretary Seward from Mr. Berry, of Oregon, who relates that a party of prospectors found in the Stickteen River, three hundred miles from its mouth, gold and silver deposits of great wealth, also rubies and agates, and on Bristol River, copper and coal indications.

Novel Method of Manufacturing Gas.—According to a Swiss journal a means has been discovered of utilizing cockchafers, or, as they are more commonly called, "June bugs." The *Estafette* of Lausanne states that between four and five millions of these insects were recently sent to Friburg for the manufacture of gas, and the residue forms an excellent carriage grease.

A Novel Speculation of the Accidental Insurance character has been started in Buenos Ayres. A joint-stock hospital has been opened to which subscribers who pay $1 20 in silver monthly are to be admitted free, and attended with the best medical skill, in case of sickness or accident.

Philadelphia Schools.—Of the total number of 142,517 children between the ages of six and eighteen within the city limits, 53·5 per cent are in her public schools; 17·4 per cent in private and parochial schools; 14·6 per cent at work, and 14·5 per cent in idleness. The children between six and eighteen are usually estimated at 18 per cent of the whole, which would give for Philadelphia a total population of 784,000.

For testing the different lubricating properties of oils and other lubricants an English inventor has contrived an apparatus whose principle depends on the amount of frictional motion necessary to produce a given temperature.

Flexible Glue.—A German chemist has discovered that if glue or gelatine be mixed with about one-quarter its weight of glycerin, it loses its brittleness and becomes useful for many purposes for which it is otherwise unfit, such as dressing leather, giving elasticity to porcelain, parchment or enamelled paper, and for book binding.

A Heavy Blast.—Two tuns of gunpowder was fired in a mine of the Salt Lime Works Company, Clitheroe, England, and the explosion which followed the lighting of the train resulted in the displacement of about 20,000 tuns of stone.

Power of the Human Voice.—It is stated that the human voice, when speaking with clear articulation and supplied from good lungs will fill 400,000 cubic feet of air. The same voice singing, under like circumstances, can fill with equal facility 600,000 cubic feet.

The Imperial Commissioners of the Exposition are proposing to give a grand entertainment to the members of the juries, the great prize holders, and other notables, while the exhibitors are about preparing a banquet for the Emperor himself, who, it is said, has given a conditional acceptance.

Remarkably Accurate.—A full examination of the United States Treasury Department shows that since 1861 $14,500,000,000 have passed through the hands of the Treasurer, in many thousand receipts and payments, but such has been the accuracy with which all these monetary affairs have been transacted, that the vaults contained the requisite cash indicated by the books, to the fraction of a dollar.

A New Alloy consisting of 65 parts tin, 8 parts copper, 10 parts lead, and 17 parts antimony, has been patented in England. The composition is particularly designed by the inventor for facing or forming calico-printing rollers. In this country these rollors have been always made of composition brass or bronze, or preferably of copper, cast, drawn and rolled directly from the ingot.

Explosion of a Letter.—While one of the employés of the New York Post Office was stamping a letter a few days since, he was much perturbed by a mysterious explosion that blew part of the letter away, and scorched his hands and face. The letter contained percussion caps upon which the stamp unfortunately descended.

A French Chemist says that thirty pounds of flesh, thirty-two pounds of blood, and sixty-two pounds of bone, contain as much nitrogen as one thousand pounds of farm manure; and hence that the carcass of a dead horse is worth more than a tun of the best farm-yard manure for the purpose of vegetation.

Graphite.—A gas pipe in the lower part of this city that had lain undisturbed for several years, was recently taken up and found to be so completely coated with graphite that pieces were sawed off in convenient size and served admirably as lead pencils.

Consumption of Paper.—England uses about 220 million pounds of paper annually, France yearly consumes 195 millions, while the United States demands more paper than both these countries combined—440 million pounds.

There are 862 journals of various kinds now published in Paris, against 416 only in 1854. The Exhibition has been the cause of eleven publications being added to the usual list.

Dirt Eaters.—An analysis of the earth eaten by the natives of the Island of Borneo shows that in 100 parts there was 15·4 of pit-coal, resin (organic matter volatile at red heat), of pure carbon, 14·9, of silica, 38·3, of alumina 27·7, and of iron pyrites, 3·7 parts.

Prolific.—In San Bernardino county, California, the farmers raise three crops a year off the same field: first oats or barley, next Indian corn, and last, turnips, beets or grass.

Bismarck was a healthy man till he achieved greatness, and now he has all the diseases which foreign correspondents attached last summer to Napoleon.

The great tabernacle of the Saints at Salt Lake City is now finished. It is 250 feet wide, and furnishes comfortable sitting room for 10,000 people.

Two century plants are now in full bloom in New Orleans, and, say the papers of that city, attract great attention.

Gold, in paying quantities, is found near Bellville, Richmond conntry Ohio.

The American Watch Company now finish a watch every two and a half minutes during the working hours of the day.

MANUFACTURING, MINING, AND RAILROAD ITEMS.

The plans for the new bridge across the Mississippi river at St. Louis have been accepted, and it is to be commenced without delay. The new bridge will be an immense structure, accommodating two double tracks of rails for street cars, beside sidewalks for foot passengers, and will consist of three arches, the central arch having a span of 515 feet, and the two side arches 497 feet. The central piers will be nearly 200 feet in hight from the bed of the river. The estimated cost of this great bridge is $5,000,000.

The Dismal Swamp canal, now in a very dilapidated condition, is to be repaired by a company composed chiefly of North Carolina speculators. It is estimated that more than a half million dollars will be needed to restore the canal to a working condition.

The Union Pacific Railroad will locate its locomotive, machine and car shops at Cheyenne, a new city just laid out at the foot of the Black Hills. Coal, iron, minerals and water power are found in proximity. At present it is a bare prairie, but within four months it will be the terminus of the railroad.

Ohio has just now two mining excitements; one is a gold mine discovered in Richland county, the other a silver discovery in Washington county. The former locality has been visited by a Cincinnatti scientist who reports extensive deposits of gold ore, the best specimens being found near Bellville on the borders of West Virginia.

In the United States there are 81 square miles of territory to each mile of railroad, and one mile of road to each one thousand of population. In Great Britain the proportion is nine miles area to one of railroad, and one mile of road to each 2,819 of population; in France the ratio is twenty-four miles to one of railroad, and one mile of road to 4,172 inhabitants. Belgium with one mile of railroad to every seven miles of territory, has a more thorough network of railroads than any other country, while Russia, with a territory twelve times the extent of the British Isles, has only one fifth the length of road.

In San Francisco, the North Pacific Fur company, capital $1,000,000, has been formed for trading in our new northern possession. The trade of this latter country in skins and furs, last year amounted to $1,500,000. These furs consisted of sea-otter, seals, blue and white foxes, mink, muskrat, beaver and bears.

The citizens of Schuylkill county, Pa., have under consideration the erection of Bessemer steel works in that county. At a meeting in furtherance of the project held in Schuylkill Haven, it was stated that $160,000 had already been subscribed. There are now only two Bessemer steel works in the country.

The directors of the New York Central Railroad Company, at their late session resolved to issue stock of the company to the holders of the stock of the Athens and Schenectady line, so as to absorb that line in the Central. This will add two millions to the capital stock of the Central Company.

The largest blast furnace in the world is at the Norton iron works, Cleveland district, England. Its capacity is 2,600 cubic feet. Although its productive powers have not yet been tested, it has already made 434 tuns of pig iron in one week.

The total consumption of roofing slates in the United States was, in 1866, 250,000 squares,—a square being ten square feet. Beside this the trade in finer slate qualities used for mantle-pieces table and billiard plates, is annually increasing in importance. There are twelve slate quarries in Pennsylvania whose combined productions in 1865 was 60,000 squares, in 1866, 90,000 squares, and this year it will reach a much higher figure, while the demand exceeds five times the present power of supply.

The Pacific Asphaltum company have an apparently inexhaustable mine of this substance convenient to San Francisco. The Asphaltum, which has the solidity of coal—powder being used to blast it—and differing entirely from that heretofore used, is found at a depth of six to ten feet from the surface, continuing in solid masses about 15 feet deep when soft and liquid matter is met with, which the company do not yet know how to employ, or dispose of.

The originator of a railroad route from Cordalia to Salta, S. A., a distance of seven hundred miles, is William Wheelwright, a native of Newburyport, Mass. The road is being built by an English company, and 130 miles of it are already completed.

EXTENSION NOTICES.

Norman Millington, of Shaftsbury, Vt, for himself and S. M. George, executrix with Abraham B. Gardner and Leland J. Mattison, executors of the estate of Davies J. George, deceased, having petitioned for the extension of a patent granted to the said Millington and George the 18th day of October, 1853, for an improvement in machines for figuring carpenters' squares, for seven years from the expiration of said patent, which takes place on the 18th day of October, 1867, it is ordered that the said petition be heard at the Patent Office on Monday, the 30th day of September next.

Harry Whittaker, of Buffalo, N. Y., having petitioned for the extension of patent granted to him the 18th day of October, 1853, for an improvement in the application of high-pressure engines to screw propellers, for seven years from the expiration of said patent, which takes place on the 18th day of October, 1867, it is ordered that the said petition be heard at the Patent Office on Monday, the 30th day of September next.

Samuel Pratt, of Hammonton, N. J., having petitioned for the extension of a patent granted to him the 25th day of October, 1853, for an improvement in screw nails, for seven years from the expiration of said patent, which takes place on the 25th day of October, 1867, it is ordered that the said petition be heard at the Patent Office on Monday, the 7th day of October next.

David M. Smith, of Springfield, Vt., having petitioned for the extension of a patent granted to him the 25th day of October, 1853, for an improvement in spring clamp for clothes lines, for seven years from the expiration of said patent, which takes place on the 25th day of October, 1867, it is ordered that the said petition be heard at the Patent Office on Monday, the 7th day of October next.

Recent American and Foreign Patents.

Under this heading we shall publish weekly notes of some of the more prominent home and foreign patents.

RAILROAD SPIKE.—Lewis Postawka, Boston, Mass.—This invention consists in constructing a spike, designed more especially for securing rails and their chains to the ties or sleepers, with a longitudinal slit extending from its point upward a certain distance, and having the ends of the slit or slitted portion beveled at their inner sides, so that, when the spike is driven into the tie or sleeper, the resistance which the latter offers to the penetration of the former, will cause the two parts of the spike, formed by the slit, to spread out or diverge, so as to effectually clinch the spike.

RUDDER.—Thomas W. Murray, New York City.—This invention consists in constructing the rudder with a cast-iron post, and securing the blade of the rudder, which is of wood, to the post in a novel way, and also in a novel way of securing the rudder post to the stem post of the vessel. The object of the invention is two-fold; to wit: to prevent the unshipping of the rudder, and to obviate the contingency of the bending and twisting-off of the rudder post.

CLEANING HARNESS AND OTHER LEATHER.—George H. McClcary, Hollidaysburg, Pa.—This invention has for its object to furnish an improved process by the use of which old harness and other dry and hard leather may be renovated, or made soft, pliable and tough.

RAILROAD CAR WHEEL.—David Forrest, Eastport, Me.—This invention has for its object to furnish an improved car wheel, so constructed that the parts most subject to wear or liable to be broken may be replaced when worn or broken, and which shall be very compact.

CHURN.—Wm. Weddington, Winterset, Iowa.—This invention has for its object to furnish an improved churn, so constructed and arranged that the churning may be done by air introduced into the churn.

GATE.—E. R. Wolfe, Plymouth, Pa.—This invention has for its object to furnish an improved attachment for closing gates, which shall be simple, cheap, efficient, easily constructed, symmetrical in appearance, and which shall have no projecting parts to catch upon passing objects.

MACHINE FOR WASHING AND DRYING DISHES.—A. W. Ward, Fishkill, N. Y.—This invention has for its object to furnish an improved machine by means of which dishes may be washed and dried quickly, thoroughly, and conveniently.

POTATO DIGGER.—Henry P. Smith, Denton, Mich.—This invention has for its object to furnish an improved machine by means of which the potatoes may be easily and rapidly dug and separated from the dirt that may adhere to them.

WASHING MACHINE.—Butler R. Platt and Joseph A. Gray, Holland, Mich.—This invention has for its object to furnish an improved machine by means of which the clothes may be washed quickly and thoroughly, and which may be easily adjusted to wash coarse or fine clothes.

HORSE RAKE.—John B. Hoag, Oxford, Ill.—This invention relates to a new and useful device for holding a horse rake when working and releasing it when loaded, to enable it to revolve and dump the hay.

COMBINED WRITING DESK AND TABLE.—Albert A. McMore, Brooklyn, N. Y.—This invention relates to a new and improved arrangement whereby two indispensable pieces of furniture are combined in one, and the invention consists in attaching the top of a table to the frame in such a manner that the table is transformed into a writing desk in one second of time, and altered to a table with equal facility.

OFFICE CHAIR.—Robert Fitts, Fitchburg, Mass.—This invention relates to improvements in the construction of arm chairs designed for use in offices and for other purposes.

EXTENSION BEDSTEAD.—Jacob Holzmann, New York City.—This invention relates to a new bedstead which can be extended in length and width, so that it can be used for children or as a double bedstead for adults, as may be desired. The invention consists in making each of the side bars as well as the end bars or heads of two pieces, so that the ends as well as the sides can be made longer or shorter at will.

CARTRIDGE BOX.—William H. Morris, Cold Spring, N. Y.—This invention consists in constructing a cartridge box with a series of blocks or cartridge receivers constructed and arranged in such a manner that a greater number of cartridges than usual may be contained in a case of a given size, and the cartridges extracted from the blocks or receivers with the greatest facility.

CULTIVATOR.—William E. Smith, Oquawka, Ill.—This invention relates to a new and improved cultivator of that class which have their plows or shares attached or arranged in such a manner as to be capable of being moved or adjusted both vertically and latterally by a person walking at the rear of the machine.

TETHERING ANIMALS.—Warren Johnson, Fisherville, N. H.—This invention relates to a new and improved device for tethering animals and is an improvement on that class of tethers which are composed of a weighted pole connected by a swivel to an upright or stake. The invention consists in an improved swivel by which the pole is connected to the upright or stake.

WASHING MACHINE.—W. W. Adams, West Derby, Vt.—This invention has for its object to furnish an improved washing machine so constructed and arranged that the washing may be done quickly and easily, which will not tear the clothes, and with which the labor of handling the clothes shall be greatly diminished.

MAKING BUNGS, PLUGS, TAPS, ETC.—Wm. L. Standish, Pittsburg, Pa.—This invention consists in constructing and combining mechanical devices for making bungs, plugs, taps, etc., for barrels and other purposes.

SASH FASTENER.—George King, John Gomber and Lindhurst Shope, Frederick, Md.—This invention relates to a new and improved device for fastening window sashes.

STEAM CUT-OFF.—L. Griswold, Portland, Wis., and G. Caul, York, Wis.—This invention consists in providing a steam chest with cylinders and pistons or valves and apertures and arranging them in such a manner that the valves or pistons which admit and cut off the steam shall not be subject to undue friction in consequence of the pressure of the steam and also so that the steam is made to operate upon the main shaft when the crank is on the center.

BROAD-CAST SEEDERS.—Jacob Slauder, Osborn, Ohio.—In this invention the seed board is made reversible, so as to throw the seed in front of or behind the plows at pleasure. Secondly—the plows can be removed and drill teeth substituted, hose being attached for the purpose of conveying the seed from the seed-board to the conducting tubes. Thirdly—the seed box can readily be adjusted to sow oats as well as wheat and other grains.

DEAD BODIES.—Colin Cree St. Clair, Washington, D. C.—In this invention a liquid composition or cement is poured around the body in a suitable mold, which, drying and hardening, effectually preserves the body and at the same time serves the purpose of a coffin or sarcophagus.

CHURN.—L. M. Cook, Owatonna, Minn.—In this invention the churn is provided with two stationary and two movable dashboards.

HEDGE PRUNER.—Frederick Bender, Baltimore, Md.—In this invention the cutting blade is made with a perfectly straight edge, and when closed enters a longitudinal slot in the opposite blade, which is also straight.

CORN PLANTER AND FERTILIZER.—John B. Gemmill, Strawbridge, Pa.—The object of this invention is to combine in one machine a corn dropping mechanism and mechanism for depositing a phosphate or other fertilizing material, together with a novel and simple arrangement of devices for operating the slides which regulate the flow of the material from the hoppers.

MACHINE FOR DIGGING AND GATHERING POTATOES.—Christian G. Grabo, Detroit, Mich.—This invention has for its object to furnish an improved machine by means of which potatoes may be dug and gathered thoroughly and cleanly.

SNOW PLOW.—R. S. Harris, Dubuque, Iowa.—This invention has for its object to furnish an improved apparatus by means of which the snow may be readily removed from the track and thrown to a sufficient distance at one or both sides of said track, to be wholly out of the way.

WINDOW-BLIND FASTENER.—Jackson R. Baker, Jersey City, N. J.—This invention has for its object to furnish an improved fastening, by the use of which the blind will be held securely when open, and which can be operated to close the blind without its being necessary to reach so far out of the window as is the case when the ordinary fastening is used.

LOCK.—Robert M. Webb, New York City.—This lock is of that class of locks employed for articles having hinged or rising and falling lids, covers, or tops, such, for instance, as pianofortes, sewing-machine cases, etc.

LATH FRAME.—Albert Reed, Mankato, Minn.—This invention relates to a frame so constructed as to facilitate the nailing and securing of laths to the side of a room and at regular and equal distances apart, so as to leave spaces or openings of a uniform size or width between the several rows or series of laths.

CULTIVATOR.—Jacob Wilson, Somerford, Iowa.—This invention relates to a new and improved two-horse cultivator for cultivating those crops which are grown in hills or drills, such as corn, cotton, etc. The invention consists in a novel and improved construction of the parts, whereby the rider or operator has full control over the plows, being enabled to raise and lower and move the same laterally with the greatest facility, and the draft mechanism also improved and rendered more favorable for the horses than hitherto.

COMPOSITION PLATE FOR ARTIFICIAL TEETH.—G. F. J. Colburn, Newark, N. J.—This invention relates to a new and improved composition for the plates in which artificial teeth, or teeth and gums, are set. The object of the invention is to obtain a composition for the purpose specified, which will admit of being manufactured or molded into the desired form, and the teeth, or teeth and gums set into it with far greater facility than hitherto, and which will also possess the advantage of admitting of repairs being made (broken teeth replaced), with far less difficulty than with either the metallic (gold) plate or with the hard rubber or vulcanite plate.

BASE FOR ARTIFICIAL TEETH.—G. F. J. Colburn, Newark, N. J.—This invention consists in combining a peculiar composition with a metal plate, whereby a very superior base for artificial teeth is obtained, one which will be strong and durable, possess the advantage of being readily and economically repaired when necessary, as, for instance, the replacing of a broken tooth, and which may be worn by any person with the greatest convenience and comfort, even those to whom the hard rubber or vulcanite bases are repulsive.

SAW MILL.—Alfred Gifford and Robert L. Felts, Milroy, Ind.—This invention relates to a new and improved reciprocating saw mill, and has for its object portability, to admit of the whole machine being drawn from place to place by yokes of cattle, and also admit of being driven or run by a small engine and to operate rapidly.

PAPER NECKTIE.—Hiram Whitney, Watertown, Mass.—This invention relates to the manufacture of neckties from paper, and consists, first, in providing a necktie made from paper, with an extension piece along its upper edge, and a folded piece upon its lower edge, having a buttonhole in the same, by means of which two pieces the necktie can be secured upon the front button of the shirt.

STOVE-PIPE SHELF RACK.—John Turner, Marshalltown, Iowa.—This invention relates to a new device for utilizing the strength as well as the heat of stove-pipes, and consists in arranging shoulders firmly around the stove-pipes, and placing thereon revolving shelves upon which plates and other kitchen utensils can be placed.

BUTTON.—Victor Charlet, Hoboken, N. J.—This invention relates to a revolving button fastening which is so arranged that the said fastening projects from one side of the shank of the button when being applied, and can be made to project from opposite side of the same after being applied.

Answers to Correspondents.

CORRESPONDENTS who expect to receive answers to their letters must, in all cases, sign their names. We have a right to know those who seek information from us; besides, as sometimes happens, we may prefer to address the correspondent by mail.

SPECIAL NOTE.—This column is designed for the general interest and instruction of our readers, not for gratuitous replies to questions of a purely business or personal nature. We will publish such inquiries, however, when paid for as advertisements at 50 cents a line, under the head of "Business and Personal."

☞ *All reference to back numbers should be by volume and page.*

A. H. G., of Mo., and also J. K. of the same state ask: "Why do the notches of the quadrant on a locomotive vary in distance when the steam is admitted and cut off in a regular ratio?" The graduation of the quadrant on the locomotive is not done by an unvarying rule. It is determined by turning the engine and noting the movement of the valves. The motion of the link is compound, owing to the setting of the eccentrics, which are not set exactly opposite each other. It is also varied by the length of the eccentric ends. Scarcely any two engines have their quadrants slotted precisely the same. Without elaborate diagrams it is impossible, on account of the above facts to demonstrate the subject.

W. J. B., of Mich., wants to know what proportion of a horse power five square inches of water, operating on a wheel 6 5-9 inches diameter, under a head of four feet, provided the water transmits its whole power, will develop. The actual weight of a column of water, not in motion, of the dimensions of five square inches sectional area and four feet high, is 42.60 lbs. The velocity of the water and the description of wheel are essential data to a categorical reply.

A. H., of N. Y., asks us to publish engravings and descriptions of the condensing steam engine. It can be found in the "Guide to Inventors," published by Munn & Co. Price 25 cents.

R. S. S., of Ga., says he has three elbows in a pipe conveying wind from a fan to a cupola, and that the fan gives much less blast than when it was run with a straight pipe. The trouble is probably in the elbows. The remedy is to make the elbows larger than the straight pipe. Where elbows are used they should have four times the sectional area of the straight pipe. Usually the pipes of fan blowers are too small.

C. F. S., of Mass.—Iron and zinc castings may be bronzed by precipitating on the surface by the battery or otherwise, a coating of copper.

D. B., of N. Y.—We have had practical experience in the manufacture of grape sugar from starch, using sulphuric acid and lime, and have fermented the sirup without encountering the difficulty you allude to. We suspect that you have mismanaged the process in some way.

J. B., of N. Y., thinks that the gases from a gun which is fired, cleave the air and leave behind them a vacuum; the concussion on filling up the vacuum produces the sound. The theory is bad: the vacuum is mostly imaginary. The gases of burning gunpowder tend to expand equally in all directions, and to produce condensation rather than rarefaction. After the bullet has left the gun there is a vacuum in its path.

M. S. D., of N. Y.—Some of the most useful cements for water joints, are white lead and oil, india-rubber, rosin and lard, shellac, sealing wax and pitch. The choice among them would be determined by the materials used in the construction of the apparatus, its size, etc.

E. H. R., of Mass.—If you still find metal unsuitable for the molds in which you cast your Babbitt or other alloy we suggest that you try soapstone. Soapstone is easily brought into form and will give a good surface to the casting.

J. B., of Ill.—The utility of sand to the blacksmith in welding iron, arises from the fact that it makes a flux with the superficial oxide which protects the iron from burning and keeps its surface clean.

J. S. McC. of Ohio.—We do not think that plaster of Paris would answer for "small and delicate cores for cast iron."

A. T. S., of Conn.—The weight of the earth has been determined with great accuracy. The elements for the calculation are the mean density (5.6604 greater than water) and the cubical contents.

G. H., of N. J.—Pine wood yields less acetic acid on distillation than almost any other kind of wood, and it is doubtful if you can separate the acid with profit in the circumstances you mention. There is nothing cheaper than lime to neutralize the acid.

J. N., of O.—We are not aware that the philosophy concerned in the renovation of feathers by steam is fully understood. There can be no doubt that feathers are often injured by parasites, and that steam will destroy them as you suggest.

R. G., of Ill.—Borax is found in California and we are told in quantity sufficient to supply the whole American market.

J. E. H., of W. Va., asks what is the power of an engine 10-inch cylinder, 20-inch stroke, making 100 strokes per minute, and carrying 90 lbs. of steam? The effective power of your engine, if you *have* 90 lbs. on the piston, working full stroke, is 33.57 horse-power. You do not say whether the steam is throttled by your governor or not. If it is, the power would be less, and can only be determined by the indicator.

N. D. J., of Mass.—We know of no way to harden a casting of soft iron unless by ordinary case hardening. Possibly some of our readers may know of some effectual method, beside chilling in the mold, to render your castings hard. We think such knowledge might be useful to some.

J. G., of Texas.—"A friend of mine who has raised a large family, and they have all married off except one daughter, and no one knows how soon she may have an opportunity to try matrimonial felicity, and as he does not wish to break up house keeping, and his wife's hands are so drawn up with the rheumatism that she neglects the dairy work and her servants have all left her, and in order to live on the dainties of the dairy it is necessary that the cows be milked, HENCE" (Good Heavens! What does he want? The above reminds us of the preamble to the Declaration of Independence. "J. G." is no doubt a rigid parliamentarian, perhaps a member of Congress, and—) "he wants a milking machine." Inventors of milking machines to the rescue!

H. A., of Conn.—The light emitted by a solution of phosphorus in oil or ether is very feeble, and would not be sufficient for a miner's lamp. The light resembles the phosphorescent light of decaying wood or fish.

R. S. N., of O.—Vegetable fiber from whatever source it is obtained, when purified from foreign matter is always the same substance chemically. Paper may be made from any vegetable fiber, but one plant will be preferred to another for the purity, strength, abundance of the fiber, etc. In a few years more paper will be made from wood than from rags. Even now it is almost entirely used on daily papers.

J. C. W., of Pa., says he is using in his foundery Scotch pig, Lake Superior, and scrap iron, and finds much difficulty in getting sound castings. Notwithstanding careful skimming, a large amount of "stodge" finds its way into the flasks and injures the castings. He asks for a remedy .... He asks also what is the proper place to put the gage cocks in a horizontal cylinder boiler of 32 inches diameter. Answer 1; the Lake Superior and scrap iron will turn to "stodge" much more rapidly than the Scotch pig; probably you use too large a proportion of those qualities. You can keep much of this scoriæ from your castings by making high and wide pouring gates, thus allowing these lighter particles to rise from your castings. Unless you do this you will find an open, porous, and rough upper surface on your castings. A small quantity of sawdust or fine charcoal thrown on the surface of your iron in the ladle will take up much of the floating scoriæ. .... Answer 2; place your lower gage cock 2½ inches above the line of fire surface, the next 2½ inches above that.

H. M. B., of Ill.—The aniline colors are readily soluble in spirit varnish, and you will find varnishes so colored useful in making the transparent paintings for your magic lantern.

NEW PUBLICATIONS.

ATLANTIC MONTHLY for August. Boston: Ticknor & Fields.

One of the best numbers of this most excellent monthly. The *Atlantic* is especially fortunate in its contributors, or rather in its managing editors; for it contrives to get the cream of current American literature. Among the other excellent articles in this number we call attention to "Hospital Memories," "Cincinnati," "Up the Edisto," and a "Lilliput Province." Indeed, every contribution and the criticisms of the Editors' department are especially superior and interesting.

SECOND ANNUAL CATALOGUE OF THE MASSACHUSETTS INSTITUTE OF TECHNOLOGY.

It exhibits a very promising future for this new institution, and we are pleased to see that mechanical and civil engineering, practical chemistry, and mining occupy prominent positions in the course of studies. For particulars address William P. Atkinson, Secretary and Librarian, Massachusetts Institute of Technology, Boylston street, Boston, Mass.

RESULTS OF METEOROLOGICAL OBSERVATIONS made at Brunswick, Me., between 1807 and 1859, by Parker Cleaveland, LL.D., Professor in Bowdoin College.

This collection of calculations, interesting and valuable to the astronomer and the geometrician, is published by the Smithsonian Institution in a large quarto pamphlet which can be obtained by addressing B. Westermann & Co New York.

SKELETON STRUCTURES, Applied to Bridges, by Olaus Henrici, Ph.D. New York: D. Van Nostrand, 192 Broadway.

Especially valuable to the practical engineer and useful to the student in civil engineering. The plates accompanying the work will be found very useful both to the student and the working engineer. The calculations and directions are plain, and will save much time and brain labor now uselessly wasted.

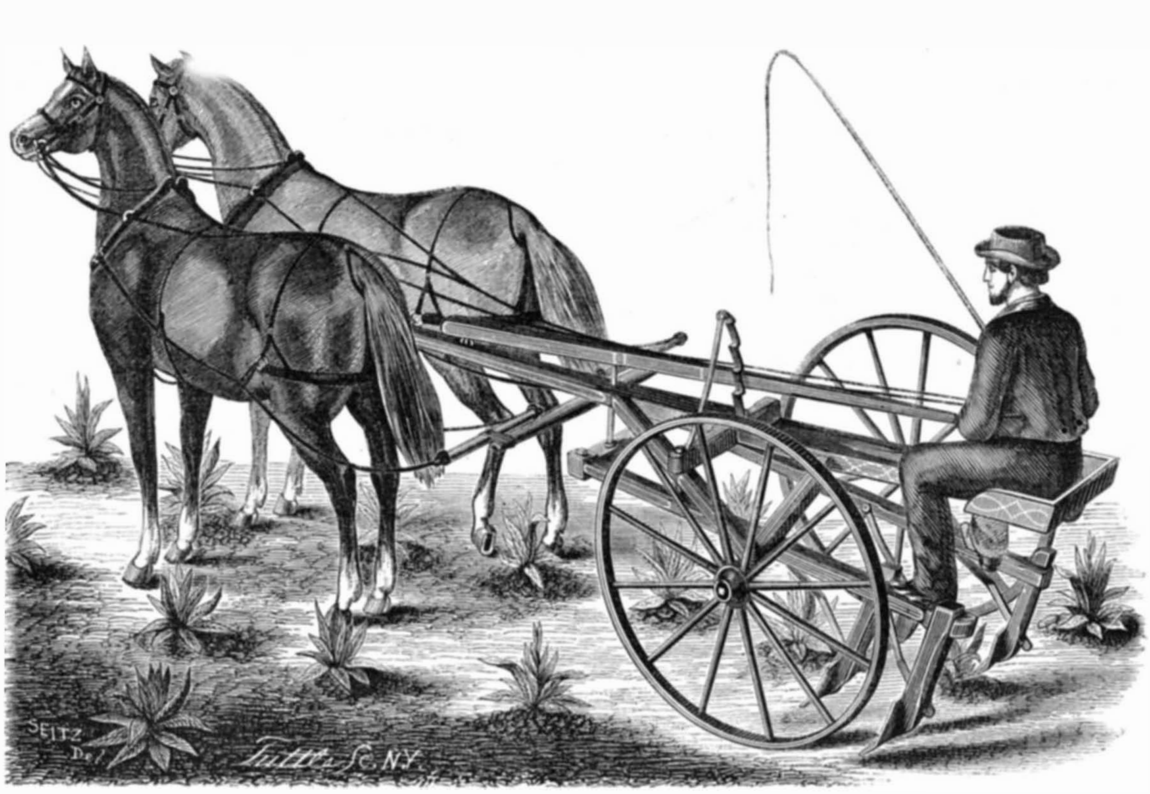
ASTRONOMICAL OBSERVATIONS Made at the United States Naval Observatory during the years 1851–2. Published by authority of the Secretary of the Navy.

For astronomers, navigators, and scientific students these tables will probably be of great use in the saving of time in making calculations, and in assisting the solution of problems usually entailing a vast amount of labor They are very systematically arranged and of easy reference.

Improvements in Cultivators.

This device for cultivating plants grown in rows or hills differs from some others in its construction. It belongs to the class the shares of which work on both sides of the row at the same time. For this purpose the axle is inclined from each wheel upward to the center, this arrangement giving a considerable hight from the ground to the longitudinal center of the vehicle. The two bars to which are secured the shares, are pivoted to diagonal braces extending from the axletree to the pole, and connected at their front ends by a bar pivoted at each end to those which carry the shares. By this arrangement the driver can move by his feet—which rest upon the bars—the shares either to the right or left to accommodate the cultivator to the sinuosities of the rows. The share bars can be readily elevated to pass over obstructions by means of the lever over the pole, which is pivoted to the pole at its front end and held in position by the toothed rack. These movements are entirely under the control of the driver. No cultivator which has yet come under our notice is so simple in construction and consists of so few parts. It would seem almost impossible for it to get out of order, and its parts are so easily made and combined that they could be built and put together by any ordinary mechanic. The number of shares can be added to or diminished as may be desirable.

A patent was obtained for this device through the Scientific American Patent Agency Feb. 26, 1867, by Omar J. Arnold of Mount Ida, Wis., who will sell rights in all the States except Illinois, Indiana, and Michigan, and for information concerning rights or machines in those States, address Mark Finnican, Dowagiac, Mich.



ARNOLD'S EUREKA CULTIVATOR.

French Photographs.

It seems to be generally admitted at the exhibition, that the pictures of Adam Solomon, an artist of Paris are pre-eminent in excellence. Photographic artists, who plumed themselves upon their merits, look upon the productions of Solomon with astonishment. Says the *Photographic News*:—

"The first excellence is the admirable arrangement of light and shade throughout the picture, as produced by the lighting and the skillfull disposition of draperies, accessories, and background, on none of which is in any case, the touch of a pencil to be found. The perfection of the chiaroscura, the rich depth and transparency of the shadows, the perfect modeling and effect of solidity and relief, not in the head simply, but in every part of the picture, are not qualities to be obtained by retouching; and we should be sorry if anyone who sees these pictures should deceive himself, and rob himself of the legitimate lesson to be acquired, by any fancy that the excellence was due to retouching, or trick of any kind, or to anything but legitimate photography of a degree of excellence very rarely attained. We do not lay any especial stress upon the fact that we have seen the negatives and the prints in the course of washing, but we earnestly urge photographers who have the opportunity, to honestly take to heart the lesson to be obtained by a careful examination of the pictures exhibited."

Aerial Navigation.

From the time of the fabled Icarus men have tried to solve by experiment the problem of navigating the air. So far the success has been confined to rising above the earth's surface by means of a gas of greater levity than the atmosphere, all mechanical means to rise above the earth and sustain the body in the air having failed. But in England they have an Æronautical Society of which the Duke of Argyle is President and Sir Chas. Bright, William Fairbairn, James Glaisher, and other prominent men are members. A paper has been read by Mr. Wenham, which is said to be "full of close reasoning, and differing entirely from the illogical speculations often put forth by enthusiastic projectors, who set to work according to methods that inevitably lead to failure." He examines at large the flight of birds, the extent of surface of wings of different kinds, the weight of bodies, the muscular strength required for flight, the much less power needed for horizontal or angular motion in the air than for perpendicular ascent, and other questions bearing on the subject. He considers that the attempt to simply imitate the flight of birds is impracticable, but concludes that "man is endowed with sufficient muscular power to enable him to take individual and extended flights, and that success is probably only involved in a question of suitable mechanical adaptations."

Boiler Burst While Being Tested.

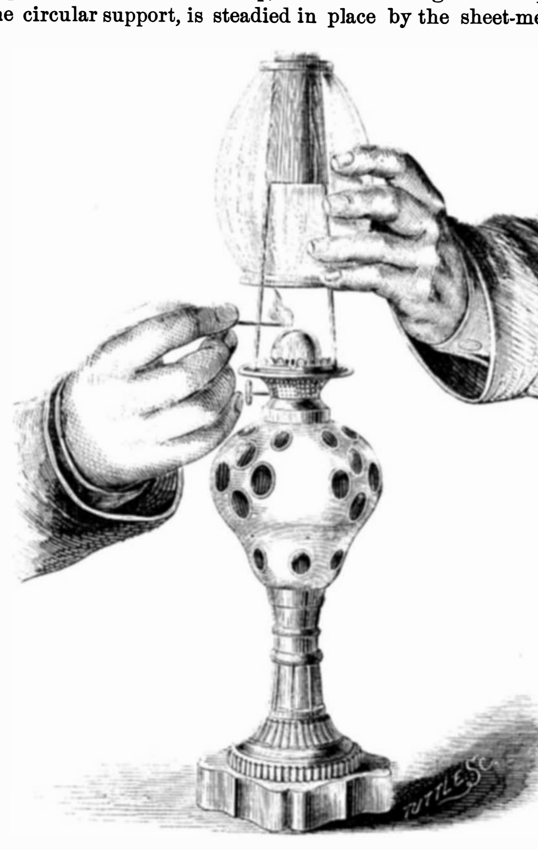
On the 20th of July a new boiler while being tested with steam at the manufactory in Water street this city, collapsed its fire-box. An after examination by a competent engineer reveals the following facts:—There was no evidence of low water in any part of the boiler; the stay bolts were all bright; the surface of the ruptures clean, as were also the joints where chipped and caulked, showing there could have been no overheating. The cause of the rupture was simply a pressure of steam beyond the ability of the plates to sustain.

The boiler was 34 inches diameter, the fire-box circular and in diameter one and a half inches less. The stays were at the angle of a parallelogram of seven by nine inches, stay bolts three-quarters of an inch diameter, screwed and headed in the usual way, the heads slight. The boiler plates were three-sixteenths thick, apparently good iron. About one-half of the fire box collapsed pulling the heads of the bolts through the plates.

The boiler was an upright tubular boiler having hanging water tubes passing through the crown sheet and hanging in the fire box, and above the crown sheet to the top of the boiler were tubes to convey away the products of combustion. As will be seen from figures already given, the water space between the fire box and the shell was only three-quarters of an inch, altogether too little.

BELLERJEAU'S IMPROVED LAMP CHIMNEY.

Metal-topped lamp chimneys are in quite common use, but the metallic top is generally connected to the glass, and except for its preservation of the glass from heat-cracking, does not appear to be a very marked advantage. In this improvement the metal top is secured to the stand for the glass chimney by means of two metal strips or uprights, and the glass slips down over the metal top, and while resting its base upon the circular support, is steadied in place by the sheet-metal



top. It has its advantages in giving excellent support to the glass while the lamp is being moved about and in the ease with which it can be lifted, as shown in the engraving. The edges of the flame, always the hottest portion, are directed against the metallic uprights, which thus defend the glass from intense heat, and the upper portion of the glass is adapted in its inside diameter to the outer diameter of the metal top, so that the draft of the chimney is not impaired.

While kerosene oil is so generally used it would seem as though this improvement, which can be applied to any lamps now in use, would become a favorite. Samples can be obtained, or the patent right may be purchased, by addressing the patentee, John Bellerjeau, or Bellerjeau & Gabel, 261 North Third street, Philadelphia, Pa. The patent for this device was granted June 4, 1867.

The Society of Arts' Albert Medal.

The Albert medal has this year been awarded to Mr. W. Fothergill Cooke, and Prof. Charles Wheatstone, F.R.S., in recognition of their joint labors in establishing the first electric telegraph. The first Albert medal was awarded, in 1864, to Sir Rowland Hill, K.C.B., "for his great services to arts, manufactures, and commerce, in the creation of the penny postage, and for his other reforms in the postal system of this country, the benefits of which have, however, not been confined to this country, but have extended over the civilized world." The second medal was awarded, in 1865, to his Imperial Majesty the Emperor of the French, "for distinguished merit in promoting, in many ways by his personal exertions, the international progress of arts, manufactures, and commerce, the proofs of which are afforded by his judicious patronage of art, his enlightened commercial policy, and especially by the abolition of passports in favor of British subjects." The third medal was awarded, in 1866, to Professor Faraday, D. L. C., F.R.S., for "discoveries in electricity, magnetism, and chemistry, which, in their relation to the industries of the world, have so largely promoted arts, manufacture, and commerce." In making the award this year, the council were placed in a somewhat peculiar position, inasmuch as by the terms upon which the medal was established they could only make one award, while the great object accomplished was due to the combined labors of two men. They felt, however, that so great a national work as the electric telegraph was especially worthy of reward by this society, and that the Albert medal could not be more worthily bestowed than in recognition of the services of those to whom the introduction of the telegraph was due. The award having been made, they have directed that the medal be struck in duplicate, and a copy, with a suitable inscription, be presented to each of the above-named gentlemen.—*Engineering*.

New Use for the Barometer.

Mr. J. Rofe writes to the *Geological Magazine*, and shows that colliery proprietors have only to watch the barometer, and provide in accordance with its indications, for the supply of air to the mines. Alluding to the well-known "Blowing Well," of Preston, in Lancashire, he states that some time since, in a well, recently constructed by him as a cesspool to some chemical works, he observed the phenomena characterizing the "Blowing Well." When the atmospheric pressure diminished, the air came from the well loaded to a disagreeable extent with the offensive vapor from the cesspool. On continuing his observations with a barometer, he found similar results. He concludes from these facts that a coal mine must be regarded as a gigantic well, from which, when the atmospheric pressure diminishes, the air expands and rushes out with great violence. This circumstance is not of itself dangerous, but if there be an excess of gas in the mine, and at the same time, from accident or carelessness, a means of ignition, then, indeed, the consequences are very likely to be serious. Hence the barometer becomes the miner's safest guide.

Petroleum as Fuel for Locomotives.

The Titusville *Herald* describes the fourth of a series of experiments made at the shops of the Warren and Franklin Railroad at Irvine, as follows:—"The apparatus used was Spencer's burner. It is described as consisting of a pan covering the bottom of the firebox in the locomotive, and taking the place of grates. On the pan are placed heaters or gas-generators, six in number, consisting of inclined plates of cast iron supported at an angle of forty-five degrees. Opposite to each heater is an injector, conveying the oil to the heater, where it is instantly converted into gases, oxygen being only furnished to the gases in their nascent state for combustion. The oil is contained in a tank on the tender, from which it is conveyed by feed pipes to the injectors, each pair of injectors being controled by a throttle by means of which the fire is regulated as readily as the light of a lamp. The locomotive used, weighed thirty-one tuns, and was of one hundred and fifty horse-power. No cars were attached. Under eighty-five pounds of steam the locomotive passed over four miles of track in less than eleven minutes. All in the party agree that oil may supersede wood and coal in railroad use."

There is at present no better field for invention than the contriving of furnaces for producing combustion safely and economically from petroleum. Also, in the feeding from and construction of tanks for conveying the liquid.

A Western Capitalist proposes to send wheat in a fleet of steam grain barges down the Mississippi River to New Orleans, and thence re-ship it to this city for the sum of thirty cents a bushel, just one-half the ruling rates when transported overland. "The longest way round is in this case, apparently, "the shortest way home."

Scientific American.

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VOL. XVII., No. 6....[NEW SERIES.] ....*Twenty-first Year.*

NEW YORK, SATURDAY, AUGUST 10, 1867.

Contents:

(Illustrated articles are marked with an asterisk.)

BRIDGING OF NAVIGABLE RIVERS.

Whether railroads are hereafter to monopolize all the carrying trade of the country—the internal traffic—or not, is a question of some importance in view of the awful experience the country has already had by such disasters as the Norwalk accident, well remembered by our readers, and the attempt recently made in the Connecticut legislature to impair if not destroy the value of the Connecticut river as a navigable stream. We are glad to say that this attempt was unsuccessful.

There is no doubt that navigable rivers, as well as lakes and oceans, are the natural highways for the commerce of the nations. To shut up or impair these highways, unless some cheaper and more valuable highway is thus opened, is suicidal on the part of any people. For freight particularly, water carriage has been so far, and is now, the cheapest and most convenient, if not the most rapid; and that policy which would close or obstruct such a natural highway must be either short-sighted or selfish. The state of Connecticut and the city of Hartford, at the head of navigation on the Connecticut, have spent and are spending thousands yearly to improve the navigable facilities of the river, by the removal of bars, etc., yet it is proposed to hamper navigation for fifty miles from the sea on this river, by the erection of bridges, leaving only a narrow draw for the passage of steamers and other craft at points of the most difficult character.

When bridges can be made to span rivers at such a hight as to leave the stream clear at all stages of its surface for vessels to pass unobstructed under them no reasonable man can object, but when it is proposed to construct piers in the bed of a river which shall be *nuclei* for the accumulation of silt, thus forming dangerous shoals, and compel the navigator to stear his craft between the Charybdis on one side and the Scylla on the other through a contracted draw, endangering not only his vessel and cargo, but also the trains of cars for which the bridge was erected, it seems as though engineering talent was fallen to a low ebb, if some better device could not be adopted. Where an elevated bridge cannot be built, and a ferry is not admissable, one would suppose that a tunnel in most cases would be feasible. Certainly, before it was determined upon that a hitherto navigable river should be obstructed for the benefit of a railroad, it would appear proper to consult the possibilities of engineering science to prevent a public damage for the benefit of a chartered corporation.

DISCOMFORTS OF RAILROAD TRAVELING.

Viewed in the light of common sense and the advances made in the mechanic arts as applied to common life, it seems strange that our people should be subjected to so much annoyance in their peregrinations from place to place by the much vaunted and boasted steam cars; which according to some enthusiastic writers really annihilate space and neutralize time. We have already spoken of the outrageously careless manner in which the *impedimenta* of travelers are handled; the destruction of trunks by the rough handling of baggage men on our lines of travel is fearful.

But the unnecessary annoyances to which the traveler must submit calls for the severest reprimand. A short time since we had occasion to travel from Boston, on the Fall River and Newport line, a distance of less than thirty miles. The trip occupied over two hours, and although the day was insufferably hot, not a drop of water could be had, and none of the cars on the train were furnished with closets. A portion of the time occupied by the trip was spent at a way station waiting for a train, and we found it difficult to ascertain when the train was to start, as no one about the station seemed to posess either authority or information. In one room of the building was a stone jar in the form of a barrel, with a faucet apparently for holding water, but it was empty and so remained until the station master, after being importuned repeatedly sent a lounger after a pail of water.

It is somewhat remarkable that in a railway station one can find the running time of every railroad on the continent, except that of the very one to which the station belongs, and it is no less worthy of note that in no case is the amount of fare given on these gilded, framed, and bedizened posters. It is sometimes a matter of as much importance to the traveler to know the price as the time of a trip. Of course no one who has had any experience in traveling—American traveling—would ask a question of a ticket seller or other official, at least if he finds it difficult to pocket an affront or insult.

Another annoyance is the habit of keeping the ticket office closed until within a minute or two of the starting of the train, thus giving opportunities to pickpockets, who always delight in a crowd. On some railroads the car doors are kept locked, while the train stands on the track, until just on the point of leaving, and old persons, weak women, and tired children are compelled to stand on an open platform or be jammed in a mis-named sitting room, and afterward forced to join in a rush for seats just before the starting of the train.

In the construction or rather fitting of our cars, also, there is room for much improvement. The unavoidable noise of such heavy bodies as loaded cars passing over rigid iron rails, is hard enough to bear, but the ear-splitting rattling of the windows and the explosive slamming of doors could easily be avoided by simple mechanical contrivances. A slip of elastic rubber in the channel of the window sash and the jamb of the door would effectually prevent the incessant and annoying rattle-bang of our railroad cars.

Certainly something should be done to protect the traveling public from annoyances which form no part of the necessary discomforts of railway passage. The resources of mechanical ingenuity can easily provide a remedy for some of them, and common courtesy and sense on the part of railway officials and employés can prevent the rest.

THE COMMISIONER OF PATENTS---HIS INCOMPETENCY AND MISMANAGEMENT.

We have called the attention of our readers from time to time to the mismanagement of the Patent Office by the present Commissioner by which the work has been suffered to fall in arrears six months, more or less, and thousands of inventors are delayed month after month in their business.

The only excuse which the Commissioner renders for this extraordinary state of affairs is that he has no room in the Patent Office to accommodate the additional force required to do the work.

There is no truth nor force in this miserable attempt of the Commisioner to palliate his own incompetency. There is room in the office to accommodate more than twenty additional Examiners, and by simply filling all the rooms, as room No. 18 is filled, the office would accommodate thirty-two more Examiners—an additional force capable of examining at least twenty thousand cases a year more than are now examined.

In Room No. 7, the large class of Textile, Fabrics, and Sewing Machines is under the sole care of one man, and he a Second Assistant Examiner only. This state of affairs has existed since the first day of June, and no effort whatever has been made to apply a remedy. Of course the class is going behind every day—no one man can do its work. Now why does not the Commissioner promote this able Second Assistant to full Examiner and give him all the force he needs? Why keep him in a subordinate capacity doing a full Examiner's work, and yet in a large room alone? His room will easily accommodate three more assistants—he is begging for help—the Commissioner knows all these things, and yet tells us that he is compelled to let the work accumulate for lack of room!

In the class of Lumber ,the examining force consists of one principal Examiner and one First Assistant. There is space in this room for at least two more persons, and the Commissioner has been repeatedly asked to furnish more help, but with no results. The class of Fine Arts and Designs, is in the same situation. So, too, is Civil Engineering; and the same state of facts exists in at least five other rooms in the Patent Office. Desks are standing vacant and have been for months, and the principal Examiners in the rooms have begged the Commissioner to fill them, yet they are vacant to day.

Nothing but the most gross incompetency can be conceived as a reason for such a state of affairs. Want of room need not embarrass any one but the incompetent man at the head of the Patent Office. If he had half the qualifications for his place that some of his temporary clerks have, the business of the office would not have been a week behind at this day.

Only last March, Congress passed a law authorizing the Commissioner to appoint four Principal, four First Assistant, and four Second Assistant Examiners, in addition to the old force of the office. Not one of these appointments has been made up to the date of writing. On the contrary the old force is not full and never has been since this Commissioner was appointed! There are now eleven vacancies; or about one quarter of the places are not filled! What excuse, we ask, can be alleged for such conduct? Why is it that for months one quarter of the old force has been missing, and every one of the twelve new places has remained empty?—"Want of room?" There are and have been empty places in Gregory's room for three more persons; in Peale's room for three more; in James' room for two; in Dean's for two; in Taylor's for two; and in Bebbs', Shoepff's, Fales', Barnett's, Crawford's, Jayne's, Blanchard's, and Conolly's, for at least one each. We say again that the flimsy excuse of want of room is not true, and no one knows it better than the Commissioner.

The excuse used to be that there was not force enough, but the Commissioner never kept his force filled up, and besides he had full power to appoint and plenty of money to pay, as many temporary clerks as he desired. A temporary clerk in each Examiner's room would have enabled the Examiner to act upon at least two cases per day more than he could do without such a clerk. The appointment of a suitable number of temporary clerks would thus have enabled the office to act upon nine thousand six hundred cases a year more than it could act upon without them, and at an expense of $4,400 a year less than it will now cost to pay the additional force provided for by the Act of Congress of March last. If the Commissioner had appointed these temporary clerks a year and a-half ago the office would have been up with its work to day, and there would be no need of this great increase of permanent officials at high salaries.

We ask the President and the Secretary of the Interior to apply a remedy at once to this state of affairs. It is a burning disgrace to the country that a Bureau in which such vast interests are at stake should be in the hands of a person who cannot administer it better than the Patent Office is now administered.

THE NUISANCE OF STEAM WHISTLES.

A correspondent writes asking if the inventive talent of the country cannot be directed to some means to abate the dreadful nuisance of the screeching, screaming whistles now so universally used by locomotives, steamers, and manufactories. He says he lives in a village contiguous to the city of Lynn, Mass., on the line of a railroad, and at all hours of the day and night his ears are tormented with the unearthly noises of the execrable steam whistle. These noises are hideous to one of a nervous temperament, absolutely injurious to the sick, and hardly tolerable to the healthiest and most robust. He says that while in Great Britain he often stopped in the hotels attached to the railroad stations, at Malvern, Chester, York and other places and can recollect no such annoyance from this source as is here felt every day. The whistles used there, although of a shriller tone, have less volume of sound than ours, and do not exert that ear-splitting quality which seems to be inseparable from ours.

We sympathise with our correspondent, but know that there is a remedy. It may be that as a peeple we are less sensitive in respect to noise than some others.but it is certain that the nervous, the feeble, the sick, are greatly annoyed by the nuisance of that most horrible of inventions—excepting perhaps that of the Chineese gong—the steam whistle. Speaking of the gong, it is simply a matter of astonishment that our hotel keepers, throughout the country could ever have been induced to adopt this barbarous instrument with its infernal clangor and make it a part of their entertainment for the wearied and exhausted traveller.

In one of our most popular evening papers, a short time since, we noticed a protest against the discord of howling screeches which from numerous manufactories salute the ear several times a day, to denote the periods of commencing and leaving work, which suggested that one would be a sufficient horror for a whole neighborhood.

It certainly seems as though there could be no adequate reason for every concern in a town or city to possess its own independent whistle, and run its own independent time, so that the agony, instead of being over in two or three minutes should be prolonged for fifteen or twenty minutes. If one whistle is sufficient for a neighborhood why should ten or twenty seek to rival it?

But a whistle can be made, which, while more far-reaching than the sharpest, will scarcely annoy the most nervous. In Connecticut there is manufactured a modification of the steam whistle called the "steam gong" which gives a deep hollow sound, not at all unpleasant, nor jarring to the nerves. It has two instead of one bell, and each is deeper than that of the ordinary whistle, one being placed directly over the other and the steam emitted downward and upward from a disk placed midway between the two. One on Colt's Factory at Hartford could be heard heard in Middletown a distance of twelve miles, and yet was not unpleasant to the ear when in its immediate vicinity. Such a device would probably save the sensibilities of the sick and be more agreeable to the well, while it would fulfill all the objects of the present screaming nuisance. Possibly Tennyson puts it rather strongly when he says:

There is no joy but calm,

but it must be confessed, that noise in itself, is not particularly agreeable except to boys and roughs.

THE SILVER PALACE CARS.

The three direct connecting railroad companies between New York and Chicago—the New Jersey Central, the Pennsylvania Central, and the Pittsburgh, Fort Wayne, and Chicago—have lately placed upon the route a new and magnificent set of passenger coaches called the Silver Palace Cars. The inauguration of these new vehicles took place on the 22d ult., and we are indebted to Mr. Jonah Woodruff, Superintendents Stearns, Williams, and McCullough, for an invitation for the excursion to Chicago and back. In about thirty-six hours after leaving Jersey City, the terminus at Chicago was reached, where the excursionists, consisting of about two hundred and fifty ladies and gentlemen, were entertained in the most superb manner. In fact, throughout the whole journey the most ample provision was made for the comfort of the guests, and all enjoyed themselves highly.

The traveler from New York to the West, may now enter the Silver Palace Cars at Jersey City, and ride for almost a thousand miles—to Chicago—without any change. By day the cars present the ordinary appearance, except that they are much more richly furnished and are provided with more abundant facilities for comfort, such as lounges and state rooms. At night they are quickly transformed into luxurious sleeping cars.

It is now some ten or twelve years since public attention was first directed to the feasibility of sleeping cars, by the publication of engravings in the SCIENTIFIC AMERICAN, illustrative of the first improvements of this kind; and among the earliest names that we find associated with the development of these inventions is that of Mr. Woodruff. He might justly be termed the King of the Sleeping Cars. He has devoted himself to their introduction with a persistence and energy deserving of all praise, and he merits the golden reward that he is now reaping.

"The Silver Palaces are among the most brilliant vehicles that ever rolled on iron wheels. The woodwork is black walnut, polished and elaborately carved; the carpets are velvet and Brussels; the seats are covered with moquet; and the whole car is most lavishly embellished with silver. Strictly, the metal is German silver fret work heavily plated, and glittering in the purest white. The lamps are of the same metal, large and ornamental. The effect of so much silver is very novel and beautiful, and this effect is enhanced by stained glass lights overhead, which shed a flood of blue tints upon the glittering silver pillars, and the fret work below."

These superb cars will undoubtedly attract large numbers of passengers, while the route they run, passing over the richest parts of the country, through glorious scenery, which is in the highest degree interesting and enjoyable.

Science Familiarly Illustrated.

GREENWICH TIME.

If we examine the time books of our trunk railways, we shall find in some of them a distinct statement that Greenwich time is kept "on this railway and all its branches;" in others, in which no similar notice occurs, the same rule is by universal consent followed; indeed, if uniform time were not thus kept, it would be an extremely difficult task to regulate safely the great number of trains which daily travel with varying speed over many of our principal lines, some of which must wait at certain points, while others, which run quicker, pass.

But the reader may ask, what is "Greenwich time?" and what "local time?" and why does Greenwich time possess such peculiar value over that of any other place as to cause it to be, so to say, at a premium? And what is "mean time?" These matters we will endeavor simply to explain.

The sun, as everybody knows, determines what we call day and night, on account of the alternate light and darkness; the daily return of the sun is therefore used as our ordinary measure of time. Two kinds of solar time are of necessity employed—*true solar time* and *mean solar time.* But why two kinds of solar time? Because true solar time cannot be conveniently used in practice, as we will explain. We must premise that true solar time at any place is such as is furnished by a sun dial; or more accurately, at noon, by noting when the shadow of a perpendicular line or rod falls due south (the true north and south line being supposed to be known), that instant being noon—true solar time. Now, let a clock at any place be set with the sun, on, say April 15. Suppose the clock to go uniformly and accurately for a year, then about the same day of the year following, the clock and sun will again be together. But will they have been together throughout the intervening year? Only on three occasions—about June 14, August 31, and December 24. At all other times, the sun will have been either somewhat before or somewhat behind the clock, the greatest deviations being fourteen and a half minutes in February, and a little more than sixteen minutes in November; the sun being after the clock at the former time, and before it at the latter time. The difference is caused by inequality in the motion of the sun, but as it would be extremely inconvenient to make our clocks keep with the sun throughout the year, and as the inequalities are comparatively small, we, in practice, neglect them altogether; and thus comes *mean solar time*, or *mean time*, that used in the daily business of life, as distinguished from *true solar time*, which agrees with *mean* or *clock time* only on four days of the year, at the times previously mentioned. Ingenious men have in ages past constructed clocks, styled "equation clocks," to keep time with the sun; but they can be considered as little more than curiosities, and not likely ever to come into general use, could they be made ever so perfect.

We have now to consider the distinction between *Greenwich time* and *local time.* The sun, as any one can see, travels through the sky from east to west. Evidently, therefore, to all places situated on a supposed north and south line, it will be noon, or one o'clock, or two o'clock, etc., at the same instant. Thus, when it is noon at Greenwich, it is also noon at all places directly north or directly south of Greenwich; and similarly for other hours; or, in other words, the local time at all such places will be the same as Greenwich time. And manifestly, as the sun comes from the east, it will be noon at all places east of our imaginary north and south line, before it is noon at Greenwich; correspondingly, at all places to the west of the same line it will be noon after it is noon at Greenwich; that is to say, local time precedes Greenwich time for all places to the east, and follows Greenwich time for all places to the west. The greater the distance of the place from Greenwich east or west, the greater will be the interval by which the local time will precede or follow that of Greenwich. The distinction between local time and Greenwich time enables us to explain the term *longitude.* The difference of longitude between any two places is merely the difference of their local times, and the longitude of any place is thus its difference in time from some point fixed on as standard. The selection of a place of reference is altogether arbitrary. The English count from Greenwich, the French use Paris, and similarly in other countries. Thus we see the Greenwich having long been the point from which longitudes were counted by the English, Greenwich time came to be that universally adopted when the necessity of uniform time arose.

Before the introduction of railways, every town and village in the kingdom kept its own local time. On the establishment of railways, however, any attempt to work them by local time could only lead to useless complication. Greenwich time was therefore employed, and gradually towns in the vicinity of railways also adopted Greenwich time, although at some places the "innovation" was opposed for a considerable period. At last, however, the use of Greenwich time came to be universal.

Having explained the distinction between *true solar time* and *mean solar time* or *mean time*, and also the distinction between *Greenwich mean time* or *Greenwich time* and *local time*, we will consider how, principally the clocks on railways are kept right. Now time is most accurately and regularly obtained in fixed astronomical observations. The standard points of reference to an astronomer are the fixed stars, as the positions of the principal stars are well known. The time of being due south, or, as it is called, the "time of southing," or any of them, being observed by the "transit instrument" the difference between the observed time and the time given in the *Nautical Almanac* is the error of the astronomer's clock. The clock used for such observations is a sidereal clock, one that keeps time with the stars, the length of the star or sidereal day being different from (and shorter than) that of the solar day. The error of the sidereal clock being thus found, it is mere matter of calculation (by the same indispensable aid, the ever necessary *Nautical Almanac*) to ascertain the error of the mean time clock. The astronomer being compelled to obtain correct time at every opportunity, for his own use, in order to be able to record with accuracy the instant at which any phenomenon that he may observe takes place, nothing is more natural than that he should willingly dispense to the public, for their benefit, that which he must, so to say, keep on hand. By connecting any such observatory to the electric telegraph system, this can be done to any extent. The observatories which have given greatest facilities in this way are, so far as we know, those of Greenwich and Liverpool in England, and Edinburgh and Glasgow in Scotland.

The distribution of time from Greenwich is very extensive. There is in the observatory at that place a clock which is kept showing exact Greenwich time, and this clock once each hour automatically indicates the time by telegraph to various points in London. One place at which time is thus received is the principal office of the Electric and International Telegraph Company; and in their office is a time-distributing apparatus, or "chronopher," the function of which is to distribute in many directions the signals received from Greenwich. A grand distribution is made at 10 A. M every day. The instrument so alters the connections of a great number of provincial wires used in the ordinary telegraphic work, that the Greenwich signal at that hour causes signals instantaneously to pass out on all these wires, indicating the time simultaneously at places north, south, east and west, to the extreme ends of the kingdom. All this is done certainly and promptly, entirely by automatic means. In this way, clocks on railways and in distant parts of the country become regulated, the town and village clocks being in their turn rectified by the neighboring railway clocks.

Now, before making special reference to what is done in the way of controlling clocks in these places we will speak further of the plan itself, as it is one likely to be of very considerable use, and well deserves to be generally known. Some years ago when galvanism first began to be of practical use to mankind, ingenious mechanicians invented systems for working clocks by use of this power alone, doing away with the customary weight or spring. Such clocks required only a simple train of wheels; they did not want winding up, and would go as long as the galvanic battery endured. It began to be supposed that a great advance had been made. In course of time, however, it was by universal consent allowed, that to depend entirely upon galvanic power was an unnecessary refinement at the best, if not indeed a mistake; the disadvantages (which need not be entered into here) outweighed the advantages, and galvanic clocks came into bad repute. The most valuable horological use of the power had not then been discovered—that of using it as an *auxiliary* only. But plans for its employment in this way began to be proposed, the most notably successful being one patented by a Mr. R. L. Jones about ten years ago. It consists as follows: Taking an ordinary wind-up clock, with seconds pendulum, the bob of the pendulum is removed, and a galvanic coil substituted. The coil is similar to a bobbin or reel of cotton, supposing the cotton to represent copper-wire insulated, so that the successive turns of the wire shall not touch each other: the coil is fixed with the hollow horizontal. Now if we set the clock going, it will still accumulate error as before. But let it be placed in telegraphic connection with some distant clock from which a *galvanic current* is received at each second of time, so that the current received shall circulate through a wire of the coil. While the current is passing, and no longer, the coil possesses magnetic properties, and such action is produced between it and a permanent steel magnet fixed to the clock case, and on to which the hollow of the coil swings at each vibration, that whether the clock be inclined to lose or gain on the standard clock, it will, by the magnetic action, be either accelerated or retarded as necessary, and maintained in perfect harmony with the standard clock, which has, so to say, merely to *guide* it, just as a man may steer, though he does not propel, a large ship. The first public application of the plan was made in the year 1857 to the clock of the townhall, Liverpool, which was adapted for control, and connected with a clock in the Liverpool Observatory. It had previously caused great inconvenience by its irregular performance; but since the commencement of the new system, the Liverpool merchants have had the satisfaction of possessing a clock, the first blow of the hammer of which, at each hour, is true to a second of time. The system has been extended in Liverpool, and since adopted both in Edinburgh and Glasgow. At the latter place it has been taken up in a remarkable manner. Not only are three large public clocks (including the clock of St. George's Church) controlled from a standard clock in the Glasgow Observatory, but also numerous smaller clocks, showing time to seconds, and situated in different parts of the city; and the system is to be extended, or perhaps now is extended, to the Clyde, for the benefit of the shipping.

At Edinburgh, the plan is used for a novel purpose. Some years ago, the citizens of Edinburgh determined to establish a gun which should be fired every day at the instant of one o'clock Greenwich time. Now, close to the gun there is placed a clock, which discharges the gun by releasing, at the proper instant, a weight, which acts upon the friction fuse of the gun. This clock must evidently be kept right, and this is done by the plan of which we have spoken. The clock is controlled by another placed within the Edinburgh Observatory, and the daily firing takes place with the greatest certainty and accuracy. The citizens of Edinburgh may congratulate themselves on having led the way in the establishment of so useful a public monitor, for, as connected with the subject we may further mention that time-guns have since been set up at Newcastle and Shields. These guns are fired by galvanic current from the observatory at Greenwich: the fuse here employed is a chemical fuse; that is to say, it is one *ignited* by the galvanic current, and it acts rapidly and well. The reports of the time guns may be heard at a considerable distance. To take time from them with accuracy, however, it is necessary to allow four and a half seconds for each mile the observer is distant from the gun, on account of the time taken by sound to travel the intervening space. And similarly for any *sound* signal. If the *flash* of the sun can be *seen*, no allowance is necessary, as light travels through any such distance in an infinitesimally small fraction of a second.

It is impossible to overrate the advantage of a reliable knowledge of exact time in all great centers of industry; and yet although time passes daily through London to many parts of the country, the people of London have (with one exception) few clocks on which they can implicitly rely. The exception—and a notable one—is the Great Clock in the New Palace at Westminster; for although so costly a production, it turns out as respects performance, to be perhaps the finest clock of the kind in the world. In the controlled clocks of which we have spoken, nothing depends on the goodness or badness of the clocks themselves, as they are kept accurately to time by the guiding power of the respective observatory clocks. But the Westminster clock is not controled by any other, and has thus to depend on its own merits. Telegraphic communication with Greenwich exists for the purpose of enabling the clock to report automatically its state every day to the Astronomer-royal; the Greenwich record, therefore, demonstrates the goodness of the machine. It is not allowed to deviate more than two seconds from true time, and we are told in one of the Astronomer-royal's Reports, that "the rate of the clock may be considered certain to much less than one second per week." The frame carrying the various trains of wheels of this celebrated clock is 15½ feet long, and four feet seven inches wide; the pendulum, which makes one vibration in two seconds, weighs between six and seven hundred weight; the dials, of which there are four, and which are illuminated at night, are each 22½ feet in diameter; and it is a day's work for a man to wind the clock up, both going and striking parts.

When we consider what is the duration of a second of time, and that such a large machine is able to perform for a week within this above mentioned limit, we may well marvel at the result, proving as it does the advance made in horological art

To railways, and their attendant telegraphs, is the improvement so far made, in the system of time-keeping in the kingdom, due. Wheresoever they penetrate, correct time should be easily attainable; and in our days, when we live so fast, and can scarcely stem the current of our daily work, an exact knowledge and an economical use of so important an element, is not to be disputed. We trust, therefore, that our endeavor to show, in a familiar way, what has so far been accomplished, will be acceptable to our readers, if only as illustrating the benefit arising from cooperation. The astronomer, possessing a knowledge of that which is so useful to mankind, has not the means of promulgating that knowledge. The electrician, on the other hand, cannot vie with the astronomer in his vocation, but possesses facilities for disseminating that knowledge to the world; and by mutual good will, mainly do the systems which we have described exist. May such combinations ever continue to flourish and extend!—*Chamber's Journal.*

To Correspondents.

We would call the attention of our correspondents to the additional notice placed over the column devoted to their benefit. While we are at all times willing and ready to make any reasonable exertions for their interest, we would impress on them that, in their communications to us, all references to statements or facts made in back numbers of this paper should specify distinctly the volume and page. A compliance with this request will save us a large amount of unnecessary labor.

Inventions Patented in England by Americans.

[Condensed from the "Journal of the Commissioners of Patents."]

PROVISIONAL PROTECTION FOR SIX MONTHS.

1,728.—MANUFACTURE AND TREATMENT OF WHITE LEAD.—Robert G. Hatfield, New York City. June 12, 1867.

1,730.—MANUFACTURE OF BRUSHES.—Lewis McD. Hills, New Haven, Conn. June 13, 1867.

1,756.—SAWS AND SAW TEETH.—Ira Brown, Charles N. Brown, and John M. Gross, Providence, R. I. June 15, 1867.

1,763.—WOOD SCREWS, AND MEANS EMPLOYED IN THEIR MANUFACTURE.—John W. Hoard and Soloman W. Young, Providence, R. I. June 17, 1867.

1,863.—CHURN.—Wm. H. Tambling, Mazo Maine, Wis. June 26, 1867.

1,864.—COTTON GIN.—Charles Spofford and Chas. H. Hersey, Boston, Mass. June 26, 1867.

1,880.—COTTON BALE TIE.—R. G. Latting, New Orleans, La. June 27, 1867.

OFFICIAL REPORT OF PATENTS AND CLAIMS

Issued by the United States Patent Office,

FOR THE WEEK ENDING JULY 23, 1867.

Reported Officially for the Scientific American

PATENTS ARE GRANTED FOR SEVENTEEN YEARS the following being a schedule of fees:—

On filing each Caveat..........$10
On filing each application for a Patent, except for a design..........$15
On issuing each original Patent..........$20
On appeal to Commissioner of Patents..........$20
On application for Reissue..........$30
On application for Extension of Patent..........$50
On granting the Extension..........$50
On filing a Disclaimer..........$10
On filing application for Design (three and a half years)..........$10
On filing application for Design (seven years)..........$15
On filing application for Design (fourteen years)..........$30

In addition to which there are some small revenue-stamp taxes. Resident of Canada and Nova Scotia pay $500 on application.

☞ Pamphlets containing the Patent Laws and full particulars of the mode of applying for Letters Patent, specifying size of model required, and much other information useful to inventors, may be had gratis by addressing MUNN & Co., Publishers of the SCIENTIFIC AMERICAN, New York.

66,934.—CULTIVATOR.—William M. Ball, Morristown, Ind.

I claim the shaker bar, L, operated by the cam, K, the slide, N, hoes, C, tubes, H, and seed box, G, all arranged in the manner and for the purpose set forth.

66,935.—SKATE FASTENER.—E. H. Barney and John Berry, Springfield, Mass.

We claim, as a new article of manufacture, a skate fastener, or key, composed of the socket, B, the point, f, and the button, e, when made or combined in one piece, substantially as herein described and for the purposes set forth.

66,936.—TEA AND COFFEE POTS.—Alfred Bayley, Newark, N. J.

I claim necks or breasts of oval tin tea and coffee pots, when the same are formed of or upon the same piece or pieces as the sides of the pot.

Also, a bottom molding formed of or upon the same piece as the sides of oval tin tea and coffee pots, when combined in forming a pot with the neck or breast formed on or of the same piece as the sides.

66,937.—APPARATUS FOR CARBURETING GAS.—W. W. Bierce, Cleveland, Ohio. Antedated April 1, 1867.

1st, I claim the provision, in a carbureting vessel, of the floating chamber, E, provided with suitable absorbent material, substantially as set forth.

2d, The arrangement of reservoir, A, having the axial inlet, F, and hollow stemmed float, D E, provided with absorbents and adapted to operate as set forth.

66,938.—RUBBER HEAD FOR LEAD PENCILS.—J. B. Blair, Philadelphia, Pa.

I claim, as a new article of manufacture, an elastic erasive pencil head, made substantially in manner as described.

66,939.—PLOW.—John D. Bowen, Roseburg, Oregon.

I claim a cutter and bar sheath, cut in one piece out of a sheet of steel, and attached to the bar of the land side so as to be removable at will.

66,940.—NIGHT LATCH.—Edward W. Berttell, Newark, N. J.

1st, I claim the dog, y, on the cylinder arm of C, fig. 4, bearing on D*, shown in fig. 1, substantially in the manner and for the purpose herein set forth.

2d, I claim the frog-bridge, D, with its nose, D*, as shown in fig. 6, substantially in the manner and for the purpose herein set forth.

66,941.—PULLEY BIT FOR BRIDLES.—William Brower, Baltimore, Md.

I claim, in combination with a bridle bit, the pulley frames and pullies, hinged or swiveled to the ends thereof, so that by drawing upon the reins passing around said pullies, there shall be no tendency of the bit to turn in the horse's mouth, substantially as described.

I also claim so combining the pulley frames and pullies with the bit as that they can be removed therefrom without impairing its use as an ordinary bit, substantially as herein described and represented.

66,942.—FOG SIGNAL.—Felix Brown, New York City, assignor to John George Gunther, State of N. Y.

1st, I claim the blowing of air, compressed air, steam, or other gaseous fluid, through perforations of disks or plates, while one or both of them are rotating, substantially in the manner described.

2d, Constructing the sound tube or trumpet with a parabolically-shaped extension, substantially in the manner and for the purposes described.

66,943.—TELEGRAPHIC SWITCH BOARD.—Walter G. Brownson, Wellsville, Ohio.

1st, I claim my improved telegraphic switch board having the within-described system of switch buttons, C C, arranged upon parallel main lines, in combination with transverse reries, 1 1 2 2 1' 1' 2' 2', etc., of switch plates, pins, or points, and with suitable ground and extra connection plates or points, the points, plates, or pins, 1 1, etc., in each particular series being connected together by wires, rods, or plates, transversely to said main lines, and each of said lines and each of their instruments having direct connection with one, and one only, of said series in regular order, all substantially in the manner and for the purpose herein set forth.

2d, I claim, also, the combination of a metallic spiral, an india-rubber or other equivalent spring, with the operating buttons, C C, of a telegraphic switch board, substantially as and for the purpose herein set forth.

3d, The combination of a base cap or cup, O, with a collar, N, and the shank, c, of a spring actuated switch-button, substantially in the manner and for the purpose herein set forth.

4th, The combination of a revolving swivel head, m, fig. 1, and attached metallic spring, n, with a metallic post or other support, L, for the purpose of making ground, or other connections, for telegraphic lines and instruments, substantially in the manner and for the purpose herein set forth.

5th, The combination of a recess or catch, i, with the rest plate, K, of a telegraphic switch board, substantially in the manner and for the purpose set forth.

66,944.—TELEGRAPHIC-BATTERY SWITCH BOARD.—Walter G. Brownson, Wellsville, Ohio.

1st, I claim combining the positive and negative poles of any number of batteries, separately, with the lines of a telegraphic system, or with the ground, by means of independent switch buttons, arranged upon a switch board to turn into contact with a point connected with the ground, and with points or plates connected with each line, all substantially in the manner and for the purpose herein set forth.

2d, Combining and uniting any two batteries, connected with the lines of a telegraphic system by means of suitable buttons and points or plates upon a switch board by means of a condensing key or button, H, combined with said board and the battery-connecting device thereon, all substantially in the manner herein set forth.

66,945.—TELEGRAPH REPEATING INSTRUMENT.—Walter G. Brownson and Daniel C. Shull, Wellsville, Ohio.

1st, The combination of the local battery circuit of any one of two main lines in a telegraphic system, with the repeater of the other line, by means of extra wires intercepting the local current between the sounder magnet and relay of first line, and so arranged as that said local circuit may be closed by the lever of the repeater, when not closed by the armature lever of said relay, and vice versa, substantially in the manner and for the purpose herein set forth.

2d, Metallic pins or rods passing through or secured to the sounder lever of a telegraphic repeater, in combination with the wires of a local circuit and a main line, and operating to open or close said line or circuit by the movements of said lever, substantially in the manner and for the purpose herein set forth.

3d, The combination of a main-line wire with a pin or rod on the sounder lever of a telegraphic repeater and with a ground-connecting spring or wire, so placed within reach of said pin as to be in contact therewith when the sounder is closed, substantially in the manner and for the purpose herein set forth.

4th. We claim elastic plates, strips, or springs, e and s, or e and w, in combination with posts, F F', and ground-connecting post, E, or G, and also, respectively, with insulated pins, c, on sounder, A, and insulated point on adjusting screw, o, of sounder post, E, when so arranged as that in the movements of the sounder, the contact of one point with its corresponding spring shall not be broken until contact is established between the second point and its spring, substantially in the manner and for the purpose herein set forth.

66,946.—TRIAL SQUARE.—John Burt and A. M. Miller, Sturgis, Mich.

We claim the employment of slotted pieces, e e e, substantially in the manner described, for the purpose of indicating at the top of the square the condition of the work.

66,947.—CIRCULAR SAWING MACHINE.—Dayton G. Canfield, Niagara Falls, N. Y.

I claim the combination of the adjustable mandrel frame, A, screw bolt, I swivel nut, K, and bearing, J, constructed, arranged, and operating substantially as and for the purposes set forth.

66,948.—SASH FASTENING.—Josiah Ward Childs, Cincinnati, Ohio.

I claim, 1st, The slotted sliding plate, a, thumb piece, a'', slots, c c, and guide pins, b b, constructed and arranged as above described and for the purpose set forth.

2d, The plate, e, latch, l, in combination with sliding wedge, a, as above described ond for the purpose set forth.

66,949.—CHURN.—L. M. Cook, Owatonna, Minn.

I claim, 1st, the stationary dashboards, B B, substantially as and for the purpose described.

2d, The arrangement and combination of the stationary and movable dashboards, substantially as and for the purpose described.

66,950.—GAS APPARATUS.—R. T. Coverdale, Circleville, Ohio.

I claim, 1st, The combination of the central tube, b, feed pipe, d, gasometer, D, oil reservoir, E, cock, e, lever, g, connecting device, h, and retort, B, said parts being arranged substantially in the manner and for the purpose described.

2d, Constructing the gasometer with a central guide tube, b, and passing the feed reservoir pipe through this tube to the retort, substantially in the manner herein described and shown.

66,951.—APPLE CORER AND SLICER.—George Custer (assignor to himself and E. B. Frick), Norristown, Pa.

I claim the base, A, its block, B, uprights, a a, and cross piece, b, in combination with the sliding cross head, c, tube of knives, i i', rods, d d, cross piece, e, the whole being constructed, arranged, and operating substantially as described.

66,952.—APPARATUS FOR HEATING TIRES.—McD. Darrow, Rochester, N. Y.

I claim a tire heater having compartments, c c, and registers, f f, and which is otherwise constructed and arranged as described, and which operates as herein set forth.

66,953.—COMBINED CLIP AND BRACE FOR CARRIAGE SPRINGS.—John H. Deal, Hornellsville, N. Y.

I claim the double clip, a a, connecting strap, b b, and brace, D, constructed in the manner deecribed, in combination with the double link plate brace, d d, applied substantially as and for the purposes herein set forth.

66,954.—STEPS FOR SPRING WAGONS.—John H. Deal, Hornellsville, N. Y.

I claim placing and securing a plate or disk, to form a step, on the iron or connecting link of platform springs for express or other wagons, substantially in the manner herein described for the purposes set forth.

66,955.—COOKING RANGE.—Royal E. Dean, New York City.

I claim the construction of a cooking range, the use or emploment of a chamber, E, constructed and operating substantially as described for the purposes set forth.

66,956.—FIFTH WHEEL FOR CARRIAGES.—J. Deeble, Plantsville, Ct.

I claim forming a connection and bearing of the two parts of a fifth wheel, at their intersection with the reach, by means of the yoke, f, and the wheel, l, so as to support and hold the two parts of the fifth wheel together, the whole constructed and operated substantially in the manner herein set forth.

66,957.—COAL STOVE.—Wm. C. Durant, West Troy, N. Y.

I claim, 1st, In combination with a fuel magazine, B, of stoves, a deflector mouth piece, C, either of a single or compound form of construction, in manner substantially as herein described and arranged to operate as and for the purpose set forth.

2d, The combination of hook-headed pendent lugs or brackets, c, on fire-pot base-plate, W, with the respectively-located coinciding notches or recesses, e, in the flaage of bed-plate ring, E, substantially as described, for the purpose of easily and quickly mounting or hanging said bed-plate ring with the fire grate, in operating position, in manner as set forth.

3d. The combination of the dumping fire-grate with an under-suspended and horizontally vibrating or shaking bed plate, and with a lever for operating them, when said fire-grate can be dumped but not vibrated independent of the bed plate, substantially as and for the purpose set forth.

4th, In combination with a horizontally vibrating grate and bed plate, and a lever for shaking them, the terminating of the end of the journal or shank by which they are vibrated, in a pocket, z, so that said shank shall not project beyond the exterior of the stove, but be accessible and operated from the outside by the shaker, through a suitable opening in said exterior, substantially as and for the purpose described.

5th, As arranged in combination with the exit pipe of a fuel magazine stove, I claim the employment of a boiler-hole plate, K, and in connection therewith, the oven, m, in manner substantially as herein set forth.

66,958.—PLOW.—Washington C. Evarts, Danby, N. Y.

I claim, 1st, Making a plow with the hinged mold boards, E E, cam wheel, D, attached to the midrib or beam frame, or other convenient part, and actuating the same as and for the purposes described.

2d, Making the cam wheel, D, adjustable by means of the hinged and slotted pieces, E E, for the purposes described.

3d, Hanging the mold boards on a separate and adjustable frame, R R, for the purpose of using thereby various sized and shaped mold boards for various uses, as described.

4th, Lap-hinging the various mold boards so far back of the plow points as entirely to conceal the hinges and protect them from the earth as it slides over the joint, as described.

5th, Extending the midrib of the beam frame, B, to near the wheel, D, and so shaping the same, in combination with the wheel, as to make an even and smooth path for the wheel, D, for the purpose of giving an even, steady motion to the cam wheel, as described.

6th, The combined whole, when virtually made and operated as described, for the purposes of double-wide furrow plow, cultivator, and digger, as set forth.

66,959.—CORN PLANTER AND GUANO SOWER.—John B. Gemmill, Strawbridge, Pa.

I claim, 1st, The hopper, C, when constructed with the two compartments, C1 C2, and provided with the reciprocating slides, E E1, and horizontal partition, F F1 G G1, for the purpose of depositing corn and a fertilizing material simultaneously, substantially as described.

2d, The springs, j, applied substantially as described, and employed for the purpose of ejecting the corn from the cells or discharge apertures of the slide, E, as set forth.

3d, The combination of the forked lever, L, pitman, M, crank, N, shaft, O, sliding frame, P, gear wheels, O1 Q1, and lever, P, all arranged to operate in the manner and for the purpose specified.

66,960.—CROSS HEAD FOR SAW MILLS.—Frederick Hermann, Grafton, Mich.

I claim the combination of the wheels, d, figs. 1 3 4 6, with the peculiar and novel method of hanging the same, by means of the boxing device shown in figs. 1 3 4 6, for the purposes and in the manner specified.

66,961.—FIRE ESCAPE.—John Heuermann, Davenport, Iowa.

I claim, 1st, The combination and arrangement of the fire-escape box, in all its parts, in the manner and for the purpose herein described.

2d, The method of attachment of such fire-escape box to an ordinary ladder, in the manner and for the purpose herein described.

3d, The method of attachment of the ladder to the fire-escape box, so as to be easily thrown to and from the building by means of the cam and ropes, arranged substantially as and for the purposes set forth.

66,962.—LIME KILN.—S. C. Hotchkiss, Sylvania, Ohio.

1st, I claim in a lime kiln the upwardly-inclining draft passages, g g h h, substantially as and for the purposes described.

2d, The combination of the upwardly-inclining passages, g g h h, with the outlet, a, and draft passage, f, substantially as and for the purposes described.

66,963.—STEERING APPARATUS.—Edward F. Howard, Boston, Mass.

1st, I claim a steering apparatus operated by means of two half screws whose threads run in opposite directions, passing through a double-threaded nut whose threads run in opposite directions, and to which the steering wheel is attached, substantially as described.

2d, I also claim, in combination with the slides, E E', operating as described the ball, b, and divided socket, s, arranged and operating as set forth.

3d, I claim the combination of the half screws, S S', constructed and arranged as described, with the double-threaded nut, N, constructed as described for the purpose of transmitting and changing the direction of motion, in the manner specified.

66,964.—PISTON PACKING.—W. S. Hudson, Paterson, N. J.

1st, I claim the combination of the adjustable packing ring, C, with one or more steam packed rings, B1 B2, so as to operate together substantially as and for the purpose herein specified.

2d, I claim the parts, A1 A2, of the piston, adapted for clamping the adjustable ring, C, as specified, in combination with steam packed rings, B1 B2 or their equivalents, as and for the purpose herein specified.

3d, I claim, in combination with packing rings arranged to operate substantially as herein specified, the projection, g, and piece, E, adapted for holding the splicing piece, G G1 G2, and consequently the whole adjustable ring, C, against turning around in the piston, substantially as and for the purpose herein set forth.

66,965.—VISE.—A. Jameson, Trenton, N. J.

I claim the combination of the plate, G, disk, H, and bolt, I, the whole being constructed and arranged for the confinement and adjustment of a vise on a bench or table, substantially as herein described.

66,966.—MACHINE FOR SHEARING SHEEP.—John V. Jenkins, Manchester, Mich., assignor to Richard B. Walker and Lewis Miller, Akron, Ohio.

I claim the jointed wrist so arranged that the wrist shaft can be placed at any angle from the vibrating beam or sway-bar, and accommodate itself to the connecting shaft without binding, cramping, or impeding the motion of the sway-bar or cutters, substantially as described.

I also claim a presser so arranged that the operator can at pleasure and while the cutters are in motion apply pressure upon said cutters to hold them to the fingers or release the pressure as occasion may require, substantially as described.

I also claim the holding or uniting of the cutters to the sway-bar by means of holes in the former and points on the latter to allow the cutters to be readily removed for sharpening and replaced, substantially as described.

66,967.—METALLIC BLIND.—J. M. Jomain, Paris, France.

1st, I claim a window blind or door constructed of a metallic plate fluted around and on its sides, and provided with slats formed in the said plate, as and for the purposes shown and described.

2d, A window blind or door of sheet iron or other sheet metal in which the slats are formed from strips partially detached from the said metal sheet or other sheet metal and bent, substantially as herein described.

66,968.—PAPER FASTENING.—M. H. N. Kendig, Washington, D. C.

I claim a paper fastener provided with a slot, a, or teats, a', in its legs or clasping points, substantially as and for the purpose set forth.

66,969.—COAL STOVE.—J. H. Keyser, New York City.

1st, I claim the application to a stove of the form and character described and shown of a conical jacket, G, which is provided with openings, c', c', corresponding to openings, c c, through the body of the stove, substantially as described.

2d, The parts, B C and D, in combination with the conical jacket, G, and a suspended open-work fire pot, E, substanially as shown and described.

3d, The relative arrangement shown and described of the openings, c' through the conical jacket, G, the opening, c, through the stove and the suspended openwork fire pot, E.

66,970.—CURTAIN FIXTURE.—E. B. Lake, Bridgeport, N. J.

I claim the roller, c, and its pulley, e, turning in brackets secured to a window sash in combination with an endless cord passing round the pulley, e, and around a pulley, i, and adjustable pin, n, or their equivalents, secured to the window frame, all substantially as and for the purpose described.

66,971.—STEAM ENGINE.—John L. Lay (assignor to himself and H. O. Perry), Buffalo, N. Y.

I claim the arrangement of the man holes, H I, with reference to the packing, L, and pistons, D E, as and for the purposes set forth.

I also claim the packing, L, constructed, arranged and operating substantially as and for the purpose described.

66,972.—STEAM ENGINE.—John L. Lay (assignor to himself and H. O. Perry), Buffalo, N. Y.

1st, I claim the combination with the abutting vertical cylinders, A B, with the piston rods, E G G L, and cross head or heads, F, arranged and operating substantially in the manner and for the purpose set forth.

2d, I also claim forming a man-hole in the piston, K, substantially as and for the purpose specified.

3d, I also claim the arrangement of the manhole, P, in the bottom head of the lower cylinder with the man-hole, O, substantially in the manner and for the purpose described.

4th, I also claim the man-hole, N, in the intermediate head of the vertical abutting cylinders, A B, arranged with reference to the man-hole, G, in the piston head, substantially as and for the purpose set forth.

5th, I also claim the guide arms, i i, in combination with the rods, G G, and cylinders, A B, operating substantially as and for the purpose specified.

66,973.—STEAM ENGINE.—John L. Lay (assignor to himself and H. O. Perry, Buffalo, N. Y.

I claim the arrangement of a high and low pressure cylinder, A B, inclined as described and connected by the pipe, E, in combination with the double crank shaft, D, connected with and operated by both, substantially in the manner and for the purpose set forth.

66,974.—STEAM ENGINE.—John L. Lay (assignor to himself and H. O. Perry), Buffalo, N. Y.

I claim a frame for supporting the cylinders, F F, of vertical compound engines composed of the converging standards, A A and H H, cap or intermediate plate, C, flanges, g g, and brackets, D D, or equivalent, with the pillars, G G, combined and arranged substantially in the mannner and for the purpose set forth.

66,975.—STEAM ENGINE.—John L. Lay (assignor to himself and H. O. Perry), Buffalo, N. Y.

1st, I claim the arrangement of the high-pressure cylinder, B, concentrically within the low-pressure cylinder, A, when both are closed by the same heads, C D, and the pistons actuate rods attached to the same cross head below the cylinders.

2d, I also claim the valve, L, provided with the cavities, u u, recesses, v, valve chamber, r, and hollow trunion, s, in combination with the ports, m n, o p, and chamber, g, for operating the two cylinders of a high and low-pressure engine, substantially as set forth.

3d, The valve constructed as described in combination with the concentric cylinders, A and B, of a high or low-pressure engine.

66,976.—STEAM ENGINE.—John L. Lay (assignor to himself and H. O. Perry), Buffalo, N. Y.

1st, I claim the employment of a tube, H, in combination with the piston rod, G, and cylinders, A B, of a high and low-pressure engine, substantially in the manner and for the purposes set forth.

2d, I also claim the valve, K, consisting of the rod, f, and pistons, g h i, arranged with reference to the ports, a b c d, and chamber, e, substantially as specified.

3d, I also claim the above-described valve in combination with the high and low-pressure cylinders, A B, provided with the tube, H, the whole arranged and operating substantially as described.

66,977.—BEEHIVE.—G. W. Leffingwell, Columbus, Wis.

I claim connecting the swing comb frames together by means of metallic loops or staples, B B, fixed in alternate sides of the frames, A, and a movable wire or rod, C, passing perpendicularly through the same so arranged as to permit the frames to open from alternate sides, substantially as and for the purpose described.

66,978.—MANUFACTURE OF AXES.—John Lippincott, Pittsburgh, Pa.

I claim the method hereinbefore described of securing the steel bit to ax polls and other edged tools by inserting the bifurcated edges, x x, of the bit into a slot or scarf on each side of the stock or poll so as to lap the edge of the stock or poll over the bit and then welding them together, substantially as and for the purposes hereinbefore set forth.

66,979.—BRICK MACHINE.—W. H. Lotz and F. Baumann, Chicago, Ill., assignors to W. H. Lotz.

1st, We claim a double toggle lever having two or more sets of legs, arranged to come into operation successively for the purpose of first pressing the brick in the mold and then removing the same therefrom, substantially as described.

2d, The slide, E, for delivering the clay to the molds and having attached to and moving with it a solid portion or metal block, F, to operate as a cover to the mold during the operation of pressing the brick, substantially as set forth.

3d, We claim the cam, J, when arranged to hold the cover of the mold while the brick is being pressed, substantially as described.

4th, We claim the stationary pins, e, located in the mold, and having the plunger that presses the brick slide on or around the pins, as and for the purpose set forth.

5th, We also claim the use of the supplementary plunger, w, resting on or supported by a spring and having the plunger, I, arranged to slide on or around it for the purpose of accommodating itself to the quantity of material in the mold, substantially as described.

6th. We claim regulating the amount of material delivered to the mold by adjusting or limiting the distance that the pressing block or plunger is withdrawn from the mold, substantially as described.

7th, We claim the screen, Z, arranged to operate in combination with the crushing rolls, W, and having a vertical motion imparted to it, substantially in the manner shown and described.

66,980.—ANIMAL TRAP.—David J. Martin, Covington, Ohio.

1st, I claim the employment of the spring trigger or catch, F, for the purpose of engaging the sliding door, D, in the manner specified.

2d, In combination with the above I claim sliding door, D, cord, H, and treadle, G, substantially as and for the purpose described.

66,981.—CARPET FASTENER.—John Matson, Bridgeport, Ct.

I claim the carpet fastener, constructed substantially as herein described, as an article of manufacture, consisting of the base, A, upright, B, and lug, D, with the screw, C.

66,982.—RENOVATING HARNESS AND OTHER ARTICLES MADE OF LEATHER.—Caroline McCleary (executrix of the last will and testament of David McCleary, deceased, assignor to George H. McCleary), Hollidaysburg, Pa.

I claim the composition for cleaning old harness and other dry and hard leather composed of the ingredients in the proportions and prepared and applied in the manner substantially as herein described and set forth.

66,983.—HARVESTER RAKE.—Jacob Miller, Canton, Ohio.

I claim in combination with a rake or fork for clearing the platform of a harvesting machine and revolved horizontally over said platform by an arm or arms driven from the main wheels, the cam, and rack and pinion motions, for projecting and withdrawing said rake or fork as well as for turning it on its arm, so that it may properly traverse the platform, enter, sweep around and deliver the cut grain, substantially as described.

I also claim the spring guard, e, for strengthening the tines, d, substantially as described.

66,984.—BURGLAR AND FIRE-PROOF SAFE.—L. H. Miller, Baltimore, Md.

1st, I claim so arranging the bolts or fastenings of a fire-proof safe door as to avoid spaces or chambers about the bolts or lock in which powder or other explosive substance might be used to open the safe, said object being effected by means substantially as described.

2d, Applying the bolts, b b, to a sliding guard plate, E, which is inclosed within the safe door so as to move in a plane parallel or nearly so to the plane of that face of the door from which the said bolts project in combination with the slots, g, in the door frame, substantially as described.

66,985.—MUSTACHE GUARD.—C. E. Mitchell and M. Moriarty (assignors to Charles E. Mitchell and Philander Evans), Bangor, Me.

We claim the said mustache guard or combination of the plate, A, and either one or two auxiliary plates, B C, and their studs, d e, or the equivalents thereof, the said auxiliary plate or plates having one or more springs applied to it or them to operate it or them, as specified.

66,986.—BOLT CUTTER.—L. J. Newlan, Barton, N. Y., assignor to himself and Stephen F. Mack.

1st, I claim making the frame of a bolt-trimming tool of the parts, B G and H, for the purpose of supporting and controlling the other parts, substantially as figured and described.

2d, I claim, in combination with the described frame of my bolt trimmer, the use of two cammed levers, A and A, hinged on the transverse pieces, B, and of two jaws or knife holders, C and C, hinged on the pieces, H, when made and operating as described.

3d, I claim the square, many-sided, or other shaped holes for the knives, F and F, in the jaws, C and C, so made that the knives can be turned or changed so as to suit the cutting of bolt in various places and positions in combination with the other figured and described parts of my bolt trimmer, as set forth.

4th, I claim the described hand tool made of the several figured and described parts, as a combined whole, making a convenient and effective instrument for trimming off the bolts of carriages and other similar uses, as described.

66,987.—SOAP.—Thomas W. Nichols, Trout Creek, N. Y.

I claim the combination of the above ingredients, used in the manner and for the purpose described.

I claim the use of cantharides, glycerin and beeswax, in the manner and for the purpose described.

66,988.—WOOD-PLANING MACHINE.—G. H. Ober, Newbury, Ohio.

I claim the herein-described cutter head, A, provided with a serrated rim, D, when used as and for the purpose set forth in combination with the adjustable cutters, C.

66,989.—MEAT CHOPPER.—Henry Obrecht, Mahanoy City, Pa.

I claim the lever, F, rod, O, wheel, K, plate, H, knives, G, and swivel, L, combined and arranged substantially as and for the purpose specified and set forth.

66,990.—HAY ELEVATOR.—Wm. L. Overhiser, Stockton, Cal.

I claim the single rope, I, in combination with the pulleys, H and K, and the block, L, for the purpose of effecting the simultaneous motion of the forks, M, in opposite directions, substantially as described.

66,991.—HORSESHOE MACHINE.—A. Reese, Pittsburg, Pa.

1st, I claim a former, either fixed or movable, and of the shape of the inside of a horse shoe, in combination with flexible arms, o, fitted with lugs, o', attached to and operated by a revolving disk or cylinder, and guides, d d, and flange, b', or their mechanical equivalents, for bending horseshoe blanks, substantially as and for the purposes hereinbefore set forth.

2d, Discharging the shoe when bent around the fixed and movable former, b, by a roller, c', operating against the lower end of a bent swinging bar, h, to which the former is attached, substantially as and for the purposes hereinbefore set forth.

66,992.—Machinery for Fitting up Stove-plate Pattern Boiler-hole Seats.—Aaron P. Rich, Troy, N. Y.

I claim the employment of a rotating tool holder, J, having a vertical feed motion, and its shaft, H, passing through a bed plate in manner substantially as set forth, in combination with circumjacent adjustable bearing or "bed" screws, q, and a slotted bed plate, D, with adjustable clamp and stay pieces, substantially in manner as herein described and for the purposes set forth.

66,993.—Automatic Boiler Feeder.—G. A. Riedel, Philadelphia, Pa., assignor to the Automatic Boiler Feeder Company, Pa. Antedated July 9, 1867.

1st, I claim the valve, C, and steam opening, d, in combination with a plunger, E, which is caused to bear on the valve by the pressure of the steam, substantially as and for the purpose described.

2d, The cylinder, s, and hollow plunger, p, in combination with the reservoir, H, and rod, h, with its piston, o, the whole being constructed and operating as and for the purpose set forth.

66,994.—Railroad Rail Coupling.—T. E. Sexton, Wilmington, Del. Antedated July 18, 1867.

1st, I claim the two plates A and A', lapped together and adapted and secured to the ends of two rails, substantially as described for the purpose specified.

2d, The lips, e, on the plate, A', arranged to underlap and confine the folds of the plate, A, as set forth.

66,995.—Venetian Blinds.—G. F. Smith, Philadelphia, Pa.

1st, I claim the application to a venetian blind of the roller, A, in combination with the flat take-up bands, B B, and the suspended operating cord, C, the said parts being constructed and applied to operate substantially as and for the purpose described.

2d I also claim, in combination with the subject matter of the preceding clause, the application of the ratchet wheel, G, the jointed gravitating pawl lever, E, the brake bar, F, and the suspended cord, H, the same being constructed and applied to operate substantially as and for the purpose described.

66,996.—Loom Picker.—Oren B. Smith, Palmer, Mass.

I claim the application of the screw bolt and its nut to the picker and the staff, substantially as described, that is, so that when the screw is set up into the nut, neither of them can turn independently of the part against which it is borne.

I also claim the construction of the screw and nut, viz.: with the ears, b b b b, arranged on them, as and for the purpose specified.

66,997.—Machine for Cutting Veneers.—T. B. Smith, Ansonia, Conn.

I claim the cylinder, H, with its cutters, a, upon a carriage, E, with the stationary cutter, d, upon its carriage, E, with the mandrel, C, when arranged so that the two carriages are moved to present the cutters upon opposite sides, substantially as and for the purpose herein set forth.

66,998.—Feed-Piston Heater.—E. R. Stilwell, Dayton, O.

1st, I claim the feed-water purifier, having its filtering chamber, f, and its cap or hood, b', arranged in the relation to corrugated pans or corrugated plates, c, and to inlet and outlet pipes, a d, substantially as and for the purpose set forth.

2d, The filtering chamber constructed and arranged as shown and described, within the horizontal chamber, A B, which has its outlet, d, arranged as shown,

66,999.—Toilet Glass.—John Stofer, Cleveland, Ohio.

I claim the pivoted rest, D, hinged arm, B, bracket, A, and glass, E, combined and arranged in the manner substantially as set forth.

67,000.—Machine for Making Cast-steel Car Wheels.—John Blake Tarr, Chicago, Ill.

1st, I claim the condensation of cast-steel car wheels while in a molten state by means of hydrostatic pressure, applied substantially as described.

2d, The use of two or more piston rods, J J J, to connect the movable section, N, follower, C, with the piston, I, in an apparatus for casting cast-steel car wheels for the purpose of obtaining uniform pressure on the metal in the mouth, substantially as described.

3d, The gage hooks, e e, or their equivalents, applied to the follower, C, for regulating the thickness of the casting, substantially as described.

4th, In a machine which is adapted to molding and pressing cast-steel car wheels, I claim connecting the core, D, with a piston moving in its own cylinder, so that said core can be raised and depressed by hydrostatic pressure, substantially as described.

5th, The combination of a cylinder, H, piston rods, J J J, and follower, C, in a machine for casting car wheels, substantially as and for the purpose described.

67,001.—Crank Motion.—Thomas Taylor, New Orleans, La.

1st, I claim, in combination with a single crank, the two slotted connecting rods and single frame, constructed and operating together, substantially as and for the purpose described.

2d, I also claim, in combination with the crank and two connecting rods, the crank slides and disconnecting mechanism, substantially such as described, for allowing said rods to pass their dead points or centers, as set forth.

67,002.—Plow.—Johann Tietz, Baltimore, Md.

1st, I claim the forked plow standard, C, as and for the purpose described.

2d, The reversible mold board, F, in combination with the standard, C, and the braces, D D, substantially as and for the purpose specified.

3d, The adjustable clevis, N, substantially as and for the purpose described.

67,003.—Device for Pulling Metal Hoops from the Finishing Rolls of Rolling Machines.—Charles W. Wailey, New Orleans, La.

1st, I claim the automatic pulling of hoops from the finishing rolls of rolling mills by means of a reciprocating carrier, arranged and operated substantially as herein described for the purpose set forth.

2d, The tongs carrier, C, with its appliances herein enumerated, substantially as described for the purpose set forth.

3d, The combination of the tongs carrier, C, and its appliances, with the guide ways, B B', as described, for the purpose set forth.

4th, The combination of the tongs carrier, C, and its appliances, the guide ways, B B', chain, D, and tooth wheel, E, with the adjustable block, P, substantially as described for the purpose set forth.

5th, The combination of the tongs carrier, C, and its appliances, the guide ways, B B', the endless chain, D, tooth wheel, E, and block, P, with the friction cone, y, substantially as described for the purpose set forth.

67,004.—Potato Digger.—John Walmsley, Buffalo, N. Y.

I claim the arrangement of the riddlers, g g and g' g', in the manner and for the purpose described.

I also claim the head, h, provided with lugs, s, and holes, i i, for the insertion of the riddlers, in combination with the combined point and share, F, screw bolts, n n', and end, J, of the sole, constructed and arranged substantially in the manner and for the purpose set forth.

67,005.—Fagot for Scythes.—H. Waters, Boston, Mass.

I claim a fagot or pile having an arrangement of iron and steel for two or more scythes, substantially as described.

67,006.—Means for Ringing Bells.—P. L. Weimer (assignor to J. A. Weimer and L. E. Weimer), Lebanon, Pa.

1st, I claim the application of ratchet teeth to the crown of a bell, which is adapted for being rotated by a vibrating lever and pawl while being rung, substantially as described.

2d, An independently-vibrating lever, C, provided with a weight and a pawl, or their respective equivalents, and applied to an oscillating yoke, B, having a rotating bell suspended from it, substantially as described.

67,007.—Brick Machine.—J. A. Welsh (assignor to himself, B. D. Anderson, R. S. Finley, Solomon K. Harner, William H. Wilson, and Chauncey W. Newton), Xenia, Ohio.

1st, I claim the conical hopper, B, having the box, C, on its side, with an opening, d, leading therein, substantially as and for the purpose set forth.

2d, The combination of the hopper, B, having its mouth rectangular in form, corresponding to the shape of the side of the brick, and slightly smaller than the mold which is to receive and form the brick, with the rotary table, I, having the mold, c, formed therein, when arranged to operate substantially as described.

3d, In combination with a series of movable molds, I claim the use of one or more rotating disks for cutting off the clay and smoothing or forming the surface of the brick.

4th, In combination with the rotating table, L, having the molds, c, formed therein, I claim the stationary table, U, when arranged to support the clay in the mold while being passed in from the hopper, as set forth.

5th, So arranging the table, I, and the screw, N, that each shall have an intermittent movement alternately to permit the wheel to remain stationary while the screw is pressing the clay into the mold, and the screw then remain stationary while the table is rotating to remove the filled mold, and present an empty mold, substantially as described.

6th, I claim the plunger, F', when arranged to operate in connection with the table, I, as set forth, for the purpose of removing the bricks from the molds after being pressed, substantially as set forth.

7th, The reservoir, J, in the interior of the plunger, having the openings, o, for the gradual escape of the oil for saturating the cloth, h, and oiling the molds, as described.

8th, The combination and arrangement of the driving wheel, D, when constructed as described, with the wheels, E and F, for the purpose of imparting to the screw, N, and the table, I, intermittent motions, as herein described.

67,008.—Seeder and Cultivator.—William and James Whait, Independence, Iowa.

We claim the seed box with oscillating bottom shaft, E, provided with wings, levers, d and g g g, cultivator, F, and cords, h h h, when all are arranged substantially in the manner and for the purpose herein set forth.

67,009.—Sulky Harrow and Cultivator.—William and James Whait, Independence, Iowa.

We claim the cultivator, B, harrow, C, levers, h h and b, and cords, i i and m, the whole being combined and operated as and for the purpose set forth and described.

67,010.—Nutmeg Grater.—R. W. Whitney and Joseph P. Davis, South Berwick, Me.

We claim the follower, D, suspended upon the bent elastic wire, E, in combination with the handle, A, and rotary grating disk, C, all arranged and operating substantially as described.

67,011.—Knife Sharpener.—McClintock Young, Frederick, Md.

I claim a knife sharpener in which files are used for the abrading or reducing surfaces, and which files are adjustable therein, so as to present new surfaces when the others are worn out or become clogged, substantially as decribed.

67,012.—Medical Compound.—I. Yount, Gettysburg, Pa.

I claim the medical compound as above described, substantially as and for the purpose specified.

67,013.—Washing Machine.—W. W. Adams, West Derby, Vt.

I claim the combination of the reel cylinder, C, fluted roller, H, and pivoted frame, G, with each other and with the box or tub, A, substantially as herein shown and described and for the purpose set forth.

67,014.—Screw Driver.—J. A. Ayres (assignor to National Screw Company, Hartford, Conn.

I claim a screw driver with a dove tailed edge, substantially as herein described.

67,015.—Window Blind Fastener.—J. R. Baker, Jersey City, N. J.

I claim the combination of the fastening, C F E, with the strap, D, of the hinge and plate, G, substantially as herein shown and described for the purpose specified,

67,016.—Dog Muzzle.—H. Belmer, and C. H. S. Schultz, Cincinnati, Ohio.

1st We claim an adjustable dog muzzle constructed substantially as and for the purpose specified,

2d, the combination in a dog muzzle of the flexible wires, A, and strap or collar, C, substantially as and for the purpose set forth.

3d The provision in a dog muzzle of loops, a, in the manner and for the purpose set forth.

67,017.—Fences.—Isaac Boone, Troy, Ohio.

I claim an adjustable fence consisting of the rails, A, batterns, B, base pieces, C, pins, F, and wedges, G, when used in connection with the brace wire, H, as and for the purpose set forth.

In combination with the elements of the preceeding clause. I also claim the serial holes, J, for the ready adjustment of braces, H, to enable a fence to suit any variable surface of ground as and for the purpose stated.

67,018.—Steam Engine Globe Valves.—J. Briggs, Roxbury, Mass.

I claim the valve constructed and arranged with the pocket partition between the outlet and inlet and with the taper plug valve, substantially as described.

Also in combination therewith, the changeable fulcrum post and lever for the purpose specified.

67,019.—Dust Pan.—A. Brigham, Cold Brook, Mass.

I claim a dust pan in which the bottom, B, conveying sides, C, and inclined back, D, are arranged as described and shown in the accompanying drawings.

67,020.—Snap Hook.—C. B. Bristol, New Haven, Conn.

I claim the combination of the hook and loop part (having a bridge, b, and stud, c, with the tongue part having a stud, e, and the spiral spring, d, when the parts are constructed arranged, and fitted to operate, substantially as herein described and set forth.

67,021.—Stand for Displaying Clothing.—W. E. Brock, New York city.

I claim a dummy for displaying articles of dress formed of sheet metal struck up in sections and secured together in any suitable manner substantially as described.

67,022.—Pasteboard Box.—Lucius Carrier, Providence, R. I. Antedated July 19 1867.

I claim making the sides and corners of pasteboard and similar boxes, by cutting and bending the flap, a, or its equivalent to form the corner and uniting the said flap with the adjoining side by dove-tailing the two parts substantially as described for the purpose set forth.

67,023.—Stud and Button Fastener.—Victor Charlet, Hoboken, N. J.

I claim the head, A, having the revolving and stationary plates provided with the locking device adapted to be locked open or closed in the manner substantially as and for the purpose specified.

67,024.—Method of Making Solid Blanks for Wagon shackles.—J. B. Clark, Plantsville, Conn.

I claim the method of making and forming the solid blanks for wagon shaft shackles of one piece of metal the grain thereof running parallel or nearly so with the direction of each arm substantially as set forth.

67,025.—Composition for Dental Plate.—G. F. J. Colburn, Newark, N. J.

I claim a composition for the plates of artificial teeth composed of the ingredients No. 1 and 2 with any suitable coloring substances such as Nos. 3 4 5, substantially as set forth.

67,026.—Base for Artificial Teeth.—G. F. J. Colburn. Newark, N. J.

1st. I claim a base for artificial teeth composed of the composition herein described, and a metallic plate arranged or combined substantially as set forth.

2d. A base for artificial teeth having its under or lingual surface composed of the composition set forth and applied to a metallic plate substantially as shown and described.

3d. I claim the composition herein specified when used for attaching one or more teeth and gums to a metallic or other base for artificial teeth,

67,027.—Steam Engine Lubricator.—Joseph Collett (assignor to himself and J. Smith), Williamsburgh, N.Y. Antedated July 5, 1867.

I claim the combination of the steam way or passage, c c, and grease passage or passages, e f, with their valves, I J, arranged for action in connection with the reservoir and grease outlet or discharge chamber, substantially as specified.

2d. The valve, J, the steam way or passage that admits steam to the upper portion of the reservoir, in combination with the stopper or cover to the lubricator so arranged in relation thereto that said cover on being shut uncloses and retains open the valve, essentially as and for the purpose herein set forth.

3d. In combination with the grease discharge valve, I, that closes by the action of the steam, the hand adjustable valve, H, for joint or separate action as herein set forth,

67,028.—Wagon Bed.—E. F. Conner, Greensbury, Ind.

I claim an adjustable extension of a wagon bed consisting of the several parts, D E and F, arranged to operate substantially in the manner, and for the purpose set forth.

67,029.—Tongues for Breast Joints, etc.—Solomon Davidson, New York city.

1st. I claim the base, a, provided with ears or lugs, b, and an eye, e' in combination with the tongue, B, constructed and operating substantially as and for the purpose set forth.

67,030.—Door Bell.—M. L. Delavan and Job Dyson, New Britain Conn.

2d, Making the socket which receives the end of the tongue solid, with the base, a, substantially as and for the purpose set forth.

We claim the combination with the slide, F, or its equivalent carrying or operating the hammer, G, of the vibratory or oscillating cam, I, controlled by a stop or stops as described, and wiper, J, or its equivalent, for operation together by the turning or rotation of the handle, B, in either direction to strike the bell, substantially as specified.

67,031.—Method of Loading and Unloading Vessels.—G. A. Fournier des Corats, Paris, France.

1st. I claim the vertical screws, d, in the vessel, a, having gear wheels, h, provided with nuts, e, operated by means of the endless screws and longitudinal rods arranged in such a manner that two or more tiers of cars may be supported in said vessel and raised or lowered substantially as described for the purpose specified.

2d. The combination of the turn tables, j, rails, l, traction chains and pulleys h o, opening boards, k, arranged in relation to the vessel, a, and operated as herein described for the purpose specified.

67,032.—Bread Cutter.—A. M. Dexter (assignor to Isaac Townsend), Philadelphia, Pa.

1st, I claim in a bread cutter, the use of a gage lever operated by the knife shaft in combination with the gage shaft furnished with teeth meshing on the toothed segment of the lever,

2d. The crank handle, C, riveted to the knife handle at one end and secured to the knife shaft at the other, as and for the purpose herein specified,

67,033.—Breech-Loading Fire-arm.—Julius Elson, Boston, Mass.

1st, I claim the device for releasing the breech block from the position required for discharging the gun, and returning to to the same position and at the same time retracting the cartridge shell, consisting of the vertical sliding breech block, g, to which one end of a coiled spring, h, is attached, the hammer, H, operating the levers, i and K, the latter provided with a hinged piece, K1, and spring, K2, which act on the bell crank lever, l, and operating also the plate, b, with the wheel, a, and pin, f, all constructed and arranged as described.

2d, I claim the combination of the plate, b, with the wheel, a, constructed as described, the springs d and p, click, c, and the bar, f, as and for the purpose described.

3d. I claim the lever or arm, K, constructed as described in combination with the levers, l m and o, and pin, n, the same composing the mechanism for retracting the cartridg shell.

4th, I claim the projections, c' c'', on the barrel, c, and the hinge, B', by means of which the barrel is secured to the stock as described.

67,034.—Office Chair.—Robert Fitts Jr. (assignor to Walter Heyward Chair Company), Fitchburg, Mass.

1st, I claim the bent wood legs, E E, in combination with the pedestal nut, D, constructed and secured together substantially as described.

2d, The cross head, C, of the screw, a, pivoted to the spider, B, in combination with the seat, A, constructed and operating substantially as and for the purpose herein described.

3d, The combination of the cross head, C, the spider, B, and the spring, c, arranged and operating substantially as herein described.

67,035.—Tunnel.—Richard Foley (assignor to himself and Edwin Ferguson), New York city.

1st, I claim the construction and arrangement of a tunnel when composed of an outer and inner skin, or lining of metal supported in position by means of the angle iron ribs, in the manner and for the purpose herein described.

2d, The construction and arrangement of a tunnel as herein described when made in sections, which are united and held in position by the collar, m, which overlaps the ends of adjoining sections, in the manner and for the purpose herein described.

3d, The construction and arrangement of the sewer, f, when used in combination with a tunnel, in the manner and for the purpose herein described.

67,036.—Car Wheel.—David Forrest, (assignor to himself and James Eldridge), Eastport, Maine.

I claim the combination and arrangement of the body, A, having an annular groove, removal annular flange piece or guard, C, having flange, e, rim, B, having pins fitting into the transverse slots, F, in the periphery of the body A, all constructed as described whereby the rim, B, is screwed in place by means of the guard, C, and reversed by removing said guard, substantially as described for the purpose specified,

67,037.—Pump.—Henry Getty, Brooklyn, N. Y.

I claim the hollow plunger, P, acting in its up stroke as a solid ram and in its down stroke as a water passage provided with a valve and piston packing at its lower end and working in the cylindrical chamber, A B, provided with an annular collar at the point of their junction forming a stuffing box through which said plunger, P, reciprocates all arranged and operating substantially as set forth.

67,038.—Saw Mill.—Alfred Gifford and R. L. Felts, Milroy, Ind.

We claim the arrangement of the driving pulley, O rod, N, slotted lever, M, pulleys, I L, belt, K, the shafts, B J, pawl, O, and spring, P, to operate in the manner and for the purposes specified.

2d, The adjusting of the inner end of the pawl, O, by means of the spring, P, and cord, m, and the lever, Q, or its equivalent substantially as and for the purpose set forth.

67,039.—Life Preserving Mattress and Raft.—John Golding, New York City.

I claim the combination of the mattress bed, A with the floating box, B, the latter having the compartments, c c, and being constructed of cork as described and provided with snaphooks and eyes or their equivalents the whole being constructed and arranged substantially as and for the purposes specified.

67,040.—Potato Digger.—C. G. Grabo, Detroit, Mich.

I claim, 1st, The shovel and catcher, H, constructed as described in combination with the finger wheel, R, and with the frame, A, of the machine substantially as herein shown and described and for the purpose set forth.

2d, The combination of the receiving and separating box, M, furnished with an upper grate or screen, m1, and lower screen m2 with the frame of the machine substantially as herein shown and described and for the purpose set forth.

3d. The combination of the supporting board, N, with the frame, A, of the machine and with the receiving and separating box, M, substantially as herein shown and described and for the purpose set forth.

67,041.—Harvester.—A. B. Graham (assignor to himself and W. B. and C. A. Worden, Waukegan, Ill.

I claim, 1st, The clearer, V, when attached to the end of the finger bar, I, and provided with the wing, W, substantially as and for the purpose set forth.

2d, The oblique arms, a' a' at the upper parts of the fingers, k, in connection with the arms b' b', at their under sides substantially as and for the purpose specified.

67,042.—Training Hopple.—W. M. Greenwood, Cincinnati, O.

I claim the arrangement of pads, A and D, straps and buckles, B C E F, and elastic band, G, as and for the purpose set forth.

67,043.—Cut-off Valve.—L. Griswold, Portland, and G. Caul, York, Wis.

1st, We claim the cylinders, C E and F, with the piston valves and rods constructed and arranged substantially as described for the purposes set forth.

2d, In combination with the above we claim the pipe, f, as herein set forth for the purpose specified.

67,044.—Door Fastening and Knife.—A. W. Hall, New York City.

I claim a pocket knife provided with a pivoted or hinged screw whereby it is made to subserve the purpose of a door fastener, substantially as specified.

67,045.—Safe.—Joseph L. Hall, Cincinnati, Ohio.

1st, I claim the bolt or bolts, C, and the casing, A, constructed with mortises, i and i', to receive the bolt or bolts, C, when thrown in either direction, substantially as and for the purpose herein described and set forth.

2d, Constructing one or more of the plates composing the door or doors and jambs, rabbets, or casings of safes or other receptacles with the tenons and grooves entering and fitting each other, when the doors are closed for the purpose of obstructing the entrance to the safes, as herein described.

67,046.—Connecting Doors and Casings of Safes.—Joseph L. Hall, Cincinnati, Ohio.

1st, I claim constructing the abutting edges of doors and casings of safes and other secure receptacles with dovetails, g, closely fitting corresponding mortises, g', substantially as and for the purpose herein described and specified.

2d, In the series of plates in the doors of safes, the plate or plates, F, having their hinged ends projecting over the plates immediately outside of them, and so arranged that they shall enter a rabbet in the body of the safe when the door is closed, and the bolt plate, H, when the same are constructed and operated substantially as specified.

3d, The conical or tapering arbors, 1, in combination with two or more plates of metal in the doors and casings of safes and other secure receptacles, the arbors being secured in the plates by keys, 2, or in other substantial manner.

4th, The combination in the doors and casings of safes of one or more sets of dovetailed plates and angle iron, B and C, one or more plates, F, and bolt plates, H, and conical or tapering arbors, 1, secured by means of keys or rivet heading upon the inside of the safes, when the same are arranged substantially as herein described and for the purpose specified.

67,047.—Boat Detaching Tackle.—F. C. Hargrave (assignor to himself, F. F. Bibber, and R. W. Bibber), Boston, Mass.

I claim in combination with the sliding rods, k, and lever, l, the stationary blocks having swing tumblers in notches of which the tackle rings are held, these tumblers being locked in position and operated to detach the boat, substantially as set forth.

67,048.—Manufacture of Carpet Lining.—John R. Harrington (assignor to Geo. W. Chipman), Brooklyn, N. Y.

I claim combining with paper rolls from which the strips to inclose the lap or fibrous material are fed, the card cylinder and cylinder screen, for forming the lap, the whole being arranged and operating together substantially as described.

I also claim forming or constructing a carpet lining by inclosing the lap between a wide and a narrow strip of paper and bending the projecting edges of the wide strip over upon and cementing or securing them to the surface of the narrow strip, substantially as set forth.

I also claim the arrangement of the cement cylinder and its rolls, in connection with the feed guide and paper rolls, substantially as described.

I also claim the method of folding the lining, substantially as set forth.

67,049.—Snow Plow.—R. S. Harris, Dubuque, Iowa.

I claim the combination of the inclined supporting car, A, inclined elevator boxes, C, endless chain of buckets, F, flaring scoop, B, ice and snow cutters, I J, and guide spouts, E, substantially as described for the purpose specified.

67,050.—Machine for Making Paper Boxes.—C. B. Hatfield (assignor to N. M. Kerr and B. W. Beesley), Philadelphia, Pa.

I claim, 1st, A chuck or box holder, A, arranged to rotate in a fixed position outside of the frame, P, substantially as described.

2d, The combination substantially as described of a slotted chuck rotating in a fixed position, with a presser-off rotating concentrically with the chuck having an endwise motion on its axis.

3d, A vibrating head holder or disk receiver arranged substantially as described, for the purpose of holding the disk to form the head of the box against the ring constituting its sides.

4th, The combination, substantially as and for the purpose described, of a vibrating disk receiver or head holder with a vibrating holding frame.

5th, The combination of the chuck, A, flanged and grooved former, B, and sliding frame, C, when arranged and operating substantially as described.

6th, The combination substantially as described of a chuck rotating in a fixed position outside the frame, a rotating former mounted in a traversing frame, and a vibrating head holder or disk receiver for the purpose of uniting the head and sides of the box by a single continuous operation.

67,051.—Machine for Making Paper Boxes.—C. B. Hatfield (assignor to N. M. Kerr and B. W. Beesley), Philadelphia, Pa.

1st, I claim the combination, substantially as described, of the cover pad or receiver, E, with the yielding ring, F, for the purpose set forth.

2d, The combination, substantially as described, of the holding chuck, vibrating pad and yielding rings, for the purposes set forth.

3d, The combination, substantially as described, of the holding chuck, A, turning brush, B, and smoothing brush, C, for the purposes described.

4th, The smoothing brush, C, arranged on an inclined adjustable shaft, as and for the purpose described.

5th, The combination, substantially as described, in a machine for making paper boxes, of a vibrating pad, a chuck projecting beyond its supporting frame and rotating in a fixed position, a brush to turn down the inner edge of the cover, and an auxiliary smoothing brush revolving inside the box, for the purpose of finishing the covering of the box without removing it from the machine.

6th, A revolving brush for turning dowh the edge of the covering paper, substantially in the manner described.

7th, A brush rotating within the box, substantially as described, for the purpose of smoothing the turned down edge of the paper.

67,052.—Mode of Putting up Matches.—Edward J. Hill, Milwaukee, Wis.

I claim, 1st, The use of india rubber or gutta percha to produce either friction or percussion in the manufacture and construction of match safe, cases, wrappers, or holders, or for safes, cases, or wrappers or holders for tapers, and for gas, lamp, and cigar lighters.

2d, The use of folded sand paper, or layers or leaves thereof, or of any other suitable material, in combination with india rubber or gutta percha, to produce friction or concussion in such manufacture.

3d, The book-like form of constructing safes, cases, wrappers, and holders matches, tapers, and cigar, gas, or lamp lighters, substantially as herein described.

4th, The mode of protecting the pasted or dipped ends of matches, tapers, and lighters by a wrapper of folded paper or any other suitable material, substantially as herein described.

5th, The use of folded paper, cloth, leather, or any other suitable material, to protect the ends of the matches, tapers, or lighters, in combination with leaves, layers, or folds of sand paper or any other suitable material, substantially as herein described, in such manufacture.

6th. The combination of the folded or protection wrapper with leaves or layers of sand paper or any other suitable material, and india rubber or guttapercha or its equivalent, substantially as herein described.

67,053.—Boiler for Heating Buildings.—Chas. F. Hitchings, New York City.

I claim, 1st, The fire chamber, A, and return flue, D, of the boiler constructed of two hollow shells or divisions, F F, united by a vertical joint as described, and having projecting chambers, G G', arranged to form the crown to the fire box and lower surface to the return flue, substantially as specified.

2d, The water bridge, C, connected and communicating by upper and lower branches with the one side or half of the body of the boiler, but loose or detached from the other half or division thereof, essentially as described.

3d, The water tubes, K, arranged to cross the return flue connected and communicating with but the one half or division of the water body or case of the boiler, as herein set forth.

67,054.—Horse Rake.—John B. Hoag, Oxford, Ill.

I claim the sliding rod, c, in combination with the staple, d, in the handle, C, the lock block, D, and catch rod, e, arranged and operating substantially as and for the purposes herein described.

67,055.—Extension Bedstead.—J. Holzman, New York City.

I claim, 1st, Constructing a bedstead so that it can be either lengthened or widened at will, or both lengthened and widened, substantially as herein shown and described.

2d, Making the side bars, A A, on each side of the bed of two pieces, and connecting the same by means of loops formed on the slats or independently, as described.

3d, Making the bars or rails, E E, which form the heads of the bedsteads, of two piecss, so that the bedstead can be widened as set forth.

4th, So constructing a bedstead by securing a longitudinal and a cross bar to each of the posts, the other ends of these bars being free, and arranging the slats extensibly, that the bedstead can be extended or contracted at will and be folded as set forth.

67,056.—Faucet.—Wm. H. Humprey, Lansingburg, N. Y.

I claim a faucet consisting of the body, A, slide, K, with its stops, lever handle, D F, detachable disk, c, spring, G, and projection, M N, with its stops, all constructed and arranged as hereinbefore specified and described.

67,057.—Device for Tethering Animals.—Warren Johnson, Fisherville, N. H.

I claim the swivel for connecting the pole, E, to the upright or stake, A, the same consisting of a tube, B, with a collar, C, permanently attached and secured on the upright or stake, and a collar, D, fitted loosely on the tube and provided with a hook projection to bear or rest upon the fixed collar, C, substantially as shown and described.

67,058.—SCOURING AND SCRUBBING MACHINE.—Simon Kaufman, Fairbury, Ill.
1st, I claim the brush or scrubber, f, or its equivalent, set in a block, C, in combination with a slotted frame, A, and having a reciprocating motion imparted to it by the driving wheel, D, or in any equivalent manner, operating in manner and for the purposes substantially as herein shown and described.
2d, The block frame. B, carrying the brushes or scrubbers, f, or their equivalents, in combination with the slotted frame, A, in manner substantially as and for the purposes described.
3d, The slotted frame, A, handle, H, cross piece, C, all as set forth, and their respective equivalents, in combination with the driving wheels, D, and axle, E, block frame, B, and crank, d, and their respective equivalents, substantially as herein shown and described.

67,059.—TUBING CLAMP.—Henry Kewley, Perry, Ohio.
I claim the collar, J, jointed sections, A B, pawl, D, lever, E, and spring, F, arranged in relation to each ather in the manner and for the purpose set forth.

67,060.—SASH FASTENER.—G. King, J. Gomber, and L. T. Shope, Frederick, Md.
We claim the arrangement of racks, b b, fastened on the sides of the sashes, B, behind the molding, A, and held engaging with the metal projections, c, upon the inside of wooden frame by means of the springs, d d, having rollers, all constructed, described and arranged in such a manner that the sashes shall be pressed outward to raise or lower, as herein set forth.

67,061.—PIE PLATE.—J. F. Kohler and S. B. Conover, New York City.
We claim the plate constructed in two portions in such manner that one portion may be detached to separately support the pie or like article, substantially as herein set forth.

67,062.—BARREL CRESSET.—John F. Little, Lockport, N. Y.
I claim the annular base, A, in combination with the perforated fire cylinder, B, and grate, I, constructed, arranged. and operating substantially as and for the purpose set forrh.

67,063.—DESK AND TABLE.—A. A. McMore, Brooklyn, N. Y.
I claim, 1st, The parts of the table top, B and C, attached to the frame, A, arranged and operating substantially as and for the purposes described.
2d, The case, D, attached to the part, C, substantially as described.

67,064.—CAR COUPLING.—J. P. Morris, Bloomington, Ill.
1st, I claim a bumper, constructed after the manner as shown herein, with ledges, b b, recess, C, catches, D D, spring, E, substantially as and for the purpose specified.
2d, The combination of the bumper, link, link block, and the several parts of each to each other, substantially as described for the purposes specified.

67,065.—CARTRIDGE BOX.—W. H. Morris, Cold Spring, N.Y.
1st, I claim the employment or use in a cartridge box of two or more blocks B, provided each with one or more rows of holes to receive the cartridges, and connected together by hinges or joints, substantially as and for the purpose set forth.
2d, Having the upper and lower surfaces, either or both, of the block rebated or ground longitudinally, so as to form planes of different hights, one for each row of cartridge holes, to admit of the ready withdrawal of the cartridges from the blocks, substantially as shown and described.

67,066.—RUDDER.—Thomas W. Murray, New York City.
1st, I claim a rudder for vessels, provided with a cast-iron post, A, having a flange or projection, a, into a wooden blade, B, which is secured to the post by metal strips, e e, substantially as and for the purpose pecified.
2d, The rudder post, A, when secured to the stern posts, C, by means of the metal straps, g, in the recesses, i, in such a manner that said posts are allowed vertical play without unshipping or becoming detached, as herein shown and described.

67,067.—CHAMBER PAIL.—James H. Orr (assignor to himself and John P. Gilbert, said Gilbert assignor to Lewis Graves), Long Island City, N. Y.
I claim, 1st, The top piece or cover, E, constructed as described, its lower edge or flange resting upon the ring, D, upon the inside of the pail, and having its opening, F, immediately over the sliding plate, H, as herein described for the purpose specified.
2d, In combination with the sliding doors, K, and cap or top plate, E, of a chamber pail, I claim the sliding plate or cover, H, substantially as described and for the purpose specified.

67,068.—POTATO DIGGER.—J. D. C. Ontwater, Newark, N. J.
I claim, 1st, The combination of curved tines with the share, substantially as described.
2d, The combination of curved tines and geared mechanism for operating them with the share, substantially as described.
3d, The combin tion of curved tines and geared mechanism with the share and its sole. substantially as described.
4th, The combination of all the last-mentioned elements with the coulter, substantially as described, with the pointer roller, H.

67,069.—WASHING MACHINE.—B. R. Platt and J. A. Gray, Holland, Mich.
I claim the double-concave reversible roller frame, C, constructed as described, in combination with the hinged frame, F, and with the box or tub A, substantially as and for the purpose herein set forth.

67,070.—LAMP.—Wm. Porter, Belleville Township, N. J.
I claim, 1st, Relieving the internal pressure in a lamp through the agency of water or its equivalent, operating substantially as described.
2d, The tube, T, and reservoir, R, or their equivalents, placed in connection with a lamp, and operating substantially in the manner and for the purposes herein set forth.
3d, The float, F, or its equivalent, attached to the wick, substantially and for the purpose described.

67,071.—RAILROAD SPIKE.—Louis Postawka, Boston, Mass., assignor to himself and A. J. Wondra, New York City.
I claim the spike, B, its upper part square, and its lower round part, b, split longitudinally, forming prongs, d d, beveled upon their inner sides, and separating when driven into the wood in a place coincident with the axis of said spike, as herein shown and described.

67,072.—SAD IRON.—David H. Priest, Watertown, Mass., assignor to himself and George Farwell, North Bridgewater, Mass.
I claim, 1st, The combination and arrangement of the stone, A, and the iron B, as applied to a sad iron, substantially in the manner and for the purpose above set forth.
2d, I claim the cold-air chamber, C, constructed and arranged and as applied to a sad iron substantially in the manner and for the purpose above set forth.

67,073.—LATH FRAME.—Albert Reed, Mankato, Minn.
I claim a lath frame constructed substantially as and for the purpose described.

67,074.—QUARTZ MILL.—Thomas Rowe, New York City.
I claim the arrangement of a central discharge in the collar, E, which forms the step for the vertical shaft, D, carrying the mullers, B, and the rakes, G H, substantially as and for the purpose described.

67,075.—BROOM HEAD.—James A. Sinclair (assignor to himself and Western T. Sinclair), Woodsfield, Ohio.
I claim the combination with the head block, A, metallic casing, G, fenders or stays, C C, clamps, F F', bars, D D', bolts, E, and handle, B, substantially as described and for the purpose specified.

67,076.—POTATO DIGGER.—Henry P. Smith, Denton, Mich.
1st, I claim the forks, J, and screens, K, constructed and arranged as herein described, in combination with the shaft, G, as and for the purpose set forth.
2d, The combination of the cog wheel, O, and segmentally-toothed cog wheel, P, with each other and with the shaft, G, and axle, A, substantially as herein shown and described, for the purpose of communicating an intermitting motion to the fork shaft, G, as set forth.
3d, The combination of a cultivator or shovel plow, X, with the axle, A, and tongue, Y, substantially as herein shown and described and for the purpose set forth.

67,077.—CHAIR SEAT.—Lewis A. Smith, Cincinnati, Ohio.
I claim a chair seat formed of metallic strips, B, passing continuously around the supporting bars and woven into two webs, as represented.

67,078.—CULTIVATOR.—William E. Smith, Oquawka, Ill.
I claim the couplings, G, composed of two parts, d d. connected by a vertical bolt, h, and having packing, i, interposed between them and the pin, f, and connected to the axle and plow beams, substantially as and for the purpose set forth.

67,079.—MACHINE FOR CUTTING BUNGS.—William L. Standish, Pittsburg, Pa.
1st, I claim the hollow taper steel cutter c, the guide pin d, the guide box E, and the die, e, constructed, combined, and operating substantially as and for the purpose herein described.
2d, The combination of the saw G, and the sliding frame H and D, constructed and operating substantially as and for the purpose herein specified.
3d, The ratchet wheel k, and pawl k', in combination with the feed rolls k2 k3, and the slide frame H, arranged and operating substantially as and for the purpose specified.
4th, The combination of the hollow cutter c, the guide pin d, the guide bar E, the die e, the saw G, the ratchet k, the feed rolls k2 k3, and the slides D and H, or the equivalents of them, or either of them, when combined and organized substantially as described, for cutting the blocks and pointing or tapering the ends of bungs, plugs, or taps in the manner specified.

67,080.—TOP FOR CEMENT-LINED PIPES.—Nathan Stephens, Brooklyn, N. Y.
I claim the lead or other like soft metal branch, C, with its stopper or stoppers fitted to project through the sheet-iron pipe A, and arranged in relation thereto, and its cement lining and covering, B B', for use in concert or combination therewith, substantially as specified.

67,081.—SPINDLE STEP.—Francis A. Sterry, Canton, Mass.
I claim the cup, C, constructed as described, in combination with the screw-threaded reversible spindle step, B, as herein set forth for the purpose specified.

67,082.—DISINFECTING AND ANTISEPTIC COMPOUND.—Joseph Strigel, Louisville, Ky.
I claim the discovery of the use and effect of the horn shavings and drugs mentioned in the preparation of the said disinfecting and antiseptic compound, when used in the proportions and manner mentioned in the above specification.

67,083.—TOY BALL PLAYER.—Isaac P. Tice, N. Y. City.
1st, I claim the combination with one or more figures, substantially such as herein described. of the ball E, mounted upon the vibrating rod, n, substantially as and for the purpose herein set forth.
2d, The three figures, B C D, constructed with vibrating or impelling arms, a, and arranged in relation with each other and with the ball E, mounted upon the vibrating rod, n, substantially as and for the purpose herein set forth.

67,084.—STOVE-PIPE SHELF.—J. Turner, Marshalltown, Iowa.
I claim the revolving shelves, D, when made and operating substantially as and for the purpose herein shown and described, in combination with the rings or flanges, C C, on the stove pipe, A, all made and operating substantially as herein shown and described.

67,085.—CHURN.—C. Vogt and X. Krapf, Allentown, Pa.
We claim the arrangement and combination of the churn barrel, C, adjustable hinge, g, cam-shaped damp, j, adjustable brake, D, and driving shaft, B, all constructed and operating substantially as and for the purpose set forth.

67,086.—CURTAIN FIXTURE.—H. Voight, Buffalo, N. Y.
I claim regulating the tension of the roller cord by the winding of a cord attached to the lower pulley or bearing thereof, around a spindle, substantially as set forth.
I also claim the combination of the knob, I, spindle, h, and friction bearing, l, with the cord, j, and pulley, E, arranged and operating snbstantially in the manner and for the purpose set forth.
I also claim the axial pin, O, of pulley, E, constructed as described, in combination with the frame, F, provided with slotted openings, r r', and stop, s, arranged and operating with the roller cord and pulley, D C, substantially as and for the purpose specified.

67,087.—APPARATUS FOR THE MANUFACTURE OF BICARBONATE OF SODA.—Alois Pöhr von Pöhrnhoff, Brooklyn, N. Y.
I claim the arrangement and combination of pipes, A C E F, blower, B, and reservoir, D, for the purpose and substantially as set forth above.

67,088.—MACHINE FOR WASHING AND DRYING DISHES.—A. W. Ward, Fishkill, N. Y.
1st, I claim the combination of the two brushes, D and I, revolving in opposite directions with the shafts, C and H, to which they are removably attached, with the box, A, and gearing, by which they are operated, substantially as herein shown and described and for the purpose set forth.
2d, The combination of the sponges, P and V, and disks, O and U, revolving in different directions with each other, with the box, A, and with the gearing by which they are operated substantially as herein shown and described, and for the purpose set forth.

67,089.—SEALING PAD-LOCKS.—R. M. Webb and I. Hermann, New York City.
1st, We claim the spring spindle, H, with sharp cutting edge, a, operating in combination with the key, N, against the seal in cap, P, substantially as described for the purpose specified.
2d, The sleeve, L, encircling the spindle, H, with arm, M, and notch, c, operating in combination with the spring spindle, H, and key, N, having projection, g, substantially as described for the purpose specified.

67,090.—CHURN.—William Weddington, Winterset, Iowa.
1st, I claim the combination of the hollow staff or tube, C, having one or more elbow tubes, E, attached to its lower end with the body, A, of the churn substantially as herein shown and described, and for the purpose set forth.
2d, The connection of the horizontal crank, wheel or pulley, G, band, j, pulley, E, with the tube, C, substantially as herein shown and described, and for the purpose set forth.

67,091.—PAPER NECKTIE.—H. Whitney, Watertown, Mass.
I claim the paper necktie constructed as described, consisting of the part E, provided with the parallel transverse slits I, to receive the folded part or ends of the tie, F, the buttonhole piece H, upon the lower side adapted to be turned back against the part E, as herein set forth for the purpose specified.

67,092.—DOCUMENT ENVELOPE.—J. W. Wilcox, N. Y. City.
I claim constructing a box or document envelope, with double ends throughout and treble ends in part, by folding and uniting flaps cut out of one sheet of paper or other material, substantially as herein described.

67,093.—CULTIVATOR.—Jacob Wilson, Somerford, Ohio.
1st, I claim the combination and arrangement of the doubletree D, rods c, levers E, and whiffletrees H, with the frame A, mounted on wheels, substantially in the manner and for the purpose set forth.
2d, The two plow beams, I J, connected together by the cross arms, h, and connected at their front ends by bolts to the pendants, G G, with the pendant guides, O, passing through loops q, at the outer sides of the beams I, substantially as and for the purpose specified
3d, The attaching of the plow standards, M M, to the cross arms, h, of the plow beams, I J, by means of the swivel bolts, i, in connection with the straps, P, passing over the fixed pulleys, Q, and the stirrups, p, all arranged to operate in the manner as and for the purpose specified.
4th, The raising and lowering of the plow beams, I J, through the medium of the levers, o, semi-circular bars, n, and straps, m, arranged substantially as shown and described.

67,094.—GATE.—E. R. Wolfe, Plymouth, Pa.
I claim the combination and arrangement of the bent lever, D, spiral spring, E, and jointed connecting rod, F, or its equivalent with each other, and with the gate, C, and post, B, substantially as herein shown and described, and for the purpose set forth,

67,095.—CHURN.—R. S. Arnall, Wright City, Mo.
I claim the arrangement of the churn box, B, with the vibrating frame, M, connected and used with the frame, A, as and for the purpose set forth.

67,096.—STEAM GAGE DIALS.—E. H. Ashcroft, Lynn, Mass.
I claim, in combination with a steam gage, A, the graduated dial, B, as shown and described, whereby the temperature corresponding to any pressure is indicated at the same time by the pointer.

67,097.—TINNERS' FOLDING MACHINE.—R. H. Birt, Kokomo, Ind.
1st, I claim the combination of the bed-plate and stationary standard, B, with the adjustable standard, C, and lever, D, and former, E, and adjustable former, E2, substantially as and for the purpose set forth.
2d, The combination of the parts, A B C D E and E2, constrncted and arranged substantially as described, with the folding door or lever, G, substantially as and for the purpose set forth.
3d, The door or lever, G, in combination with the adjustable springs, H, constructed and arranged substantially as and for the purpose set forth.

67,098.—COTTON TIE.—E. B. Bishop, New Orleans, La.
I claim the projecting lips, C C, cut as described at their junction with the plate, the whole being constructed as described, for the purpose set forth.

67,099.—SEWER PIPE MACHINE.—W. K. Black, Philadelphia, Pa.
1st, I claim the revolving screw shaft, B C D, suspended from its bearings when leaving a space between it and the bottom of the cylinder, as and for the purpose specified.
2d, The construction of the shaft, B, of wrought iron and the spiral flange, D, and shaft, C, of cast iron forming the cutting, tempering and forcing parts, B C D, substantially as described for the purpose specified.
3d, The suspended core pin, I, in combination with the funnel, H, substantially as describd for the purpose specified.
4th, The removable ring, G, supporting the removable die, H I, substantially as described.
5th, In combination with the revolving screw, the door, F, of the sectional cylinder extending from top to bottom thereof, for the purpose described and in the maneer specified.

67,100.—CLOTHES PIN.—A. W. Brinkerhoff, Upper Sandusky, Ohio.
1st, I claim constructing a clothes pin out of one piece of sheet spring metal possessing in full the spring, clasp, and levers for expanding the lips, as and for the purposes set forth.
2d, I claim such manner or form of construction of clothes pins when made out of one piece of sheet metal as wlli secure both the spring and fulcrum between ascending levers and so that by pressing the levers together at their upper ends their inner sides shall be brought to bear against the fulcrum and thereby spread the lips in applying or removing it from the line.

67,101.—JUMPING HOOP.—C. L. Browne, Brooklyn, N. Y. Antedated July 5, 1867.
I claim the invention of a jumping hoop by the combination of a wooden cross piece with a hoop secured thereto by metal connections or by mortise, as in annexed drawings,

67,102.—CLOTHES DRIER.—L. S. Calkins, El Paso, Ill.
I claim the use of the two frames herein described constructed and hinged together at their upper ends and provided with the blocks, e e, substantially as and for the purpose herein set forth.

67,103.—LIFTING JACK.—Samuel J. Clark, Detroit, Mich.
I claim the combination and arrangement of the lever, A, the standard, B, the hinge, C C, ratchet, D, pawl, E, and hook, F, for the purposes above described.

67,104.—MODE OF PRESERVING WOOD.—Charles E. Clarke, George Hadley, and John C. Clifford, Buffalo, N. Y.
We claim the within described process of treating wood for the purpose of preserving, protecting, solidifying, or coloring the same.

67,105.—CHURN.—John E. Cryer, Greenpoint, N. Y.
1st, I claim the spiral threaded shaft, B b, in combination with the traversing nut, E e, and with oscillating dashers arranged to operate substantially in the manner and for the purpose herein specified.
2d, I claim the fork link, H H1 H2, connected to the nut, E e, and arranged to operate relatively thereto and to the spiral threaded shaft, B b, and to the hand lever, G, or its equivalent, substantially as and for the purpose herein specified.
3d, I claim mounting the within described partially revolving shaft, B B', between pivots, a c, in the manner represented, one of the said pivots being fixed on a cross bar, C C1 C2, secured in bearings, A1 A2, by means of the removable wedge, D, so as to allow the whole to be connected and disconnected in the manner and for the purposes herein set forth.

67,106.—THRASHING MACHINE.—J. Cummings and H. Harrington, Woodstock, Canada.
We claim, 1st, The combination and arrangement of the alternating reciprocating bars, H H, having also a vibrating up and down motion at the front end with the straw carrier, C, having a longitudinal reciprocating motion and a vibrating up and down motion at the rear end substantially as and for the purposes set forth.
2d, The thin elastic metal tips, b, on the near end of bars, H, running in the cross-guide piece, I, as described and for the purpose set forth.
3d, The perforated board, H, under the crank shaft, J, and forming a part of the slatted carrier, C, as and for the purpose specified.
4th, The pendent screen or dividing board, B, constructed, arranged and operating as described; employed in combination with the bars, H, and carrier, C, as set forth.
5th, The construction and arrangement of the grain carrier, L, forming part of the shoe, and provided with the inclined slatted screen, M, at the end, as shown in combination with the carrier, C, and reciprocating bars, H H, the whole arranged and operating substantially as specified.
6th, Connecting both the shoe and straw carrier by the rod, o, and operating them by the same rock-shaft, A, in the manner described.

67,107.—FOLDING SEAT AND ARM.—F. J. Dibble (assignor to himself and Marshall E. Hunter), Chicago, Ill.
1st, I claim, in combination with a folding seat, C, a folding arm, L, operating substantially as herein specified.
2d, The combination of the seat, C, arm, D, axle, F, slot, I, and pin, H, with the jointed arm, L, arranged and operating as and for the purposes specified.
3d, The combination of the folding arm, L, with the seat, C, the arm, D, axle, F, slot, I, and pin, H, and rubber, J. substantially as and for the purposes set forth.
4th, In combination with the last above, I claim the arrangement of the rubbers, K K, or their equivalent, in the manner and for the purposes described.

67,108.—MODE OF BURNING HYDROCARBON LIQUIDS.—Clark Fisher (assignor by mesne assignments to himself), Trenton, N. J.
1st, I claim the apparatus substantially as described.
2d, The location of the apparatus outside of the chamber where the combustion is effected, so that it may not be affected by the heat of the same.
3d, The method of regulating the supply of steam by the screwing outward or inward of B.
4th, The delivery of liquid hydrocarbon for combustion in the form of spray, by means of a jet of steam, substantially as herein described.

67,109.—MACHINE FOR MANUFACTURING SHEET-METAL PANS.—John Goodin, Erastus F. Blair, and John Lyda, Georgetown, Ohio.
1st, We claim the expansive die, H H' H", provided with curved corner grooves, h', and constructed and operated substantially in the manner and for the purpose specified.

67,110.—SKATE FASTENING.—G. Gunderson, Chicago, Ill. Antedated July 11, 1867.
1st, I claim the plate, D, having the projections, a a b, in combination with the plate, c, spring, g, lock, e, boot, C, and skate, A B, when constructed substantially as and for the purpose set forth.

67,111.—ENVELOPE.—W. E. Haskins, New York City.
I claim the trapezoidal projections, D D, of the box envelope between the flap, A, ends, E E, and the upper corners of the joint, B, folded in the medium line, b d, and lines a d and d c, whereby the corners of the envelope are completely closed, snbstantially as described, for the purpose specified.

67,112.—BOILER TUBE CLEANERS.—William P. Heffron (assignor to himself and George H, Sayre), Chicago, Ill.
1st, I claim the combination of the traveling or feed wheel, G, and a series (one or more) of revolving cutters, M, arranged and operating substantially as and fo the purposes herein specified.
2d, The combination of the cutter-holder, with its cutters and traveling wheel, G, with the gearing shown, for the purpose of operating the same as and for the purpose set forth.
3d, In combination with said traveling wheel and revolving cutters, I claim the case, A B, provided with a central opening for the tube, arranged and operated substantially in the manner and for the purposes described and set forth.

67,113.—HYDRAULIC CRANES.—D. S. Hynes, Brooklyn, N.Y.
1st, I claim the combination of the cylinder and ram with an internal central support, constructed substantially as and for the purpose described.
2d, The arrangement with the cylinder and ram of a jib. constructed with a mast, said mast being provided with a suitable guide above the jib, substantially as and for the purpose described.
3d, The arrangement in the lower part of the mast of a device for unlocking or releasing it from the ram, substantially as described.
4th, The arrangement with the jib of an intermediate brace substantially as and for the purpose described.
5th, The combination with the carriage running upon the jib of a vertical friction roller, substantially as and for the purpose described,
6th The introduction of air under pressure at any convenient point in the cylinder, for the purpose of blowing the water out that may remain, and in its connecting pipes after use, substantially as described.

67,114.—AUTOMATIC DENTAL MALLET.—Hial Hodge and Joseph P. Noyes (assignor by mesne assignment to Samuel S. White) Binghamton, N. Y.
1st, We claim the combination substantially as shown and described in the drawing and specifications before referred to, by which the blow is produced by simply pressing down the finger-piece, h.
2d, The graduation of the force of the blow by the screw, combined with the finger-piece, substantially as shown and described.
3d, The combination, substantially as shown and described, by which the point, f, is held firmly in its place, and any sliding in the instrument avoided, thus enabling it to be used as an ordinary hand pl gger whenever desired.

67,115.—CORN PLANTER.—W. W. Hubbard, Edinburgh, Ind.
1st, I claim the log or drag, A, provided with a seed or corn hopper in its rear end, or used with it, as and for the purpose set forth.
2d, The handles, D, lever, E, and seed slide C, arranged with the log with a hole through its center, and hopper, B, as and for the purpose set forth.
3d, The hoe or coverer, I, connected to the drag and handles, and operating substantially as and for the purpose set forth.
4th, The mole or flange, L, on the under side of the log or drag, used substantially as and for the purpose set forth.

67,116.—COMPOUND LOCK FOR DOORS.—George Hubert, Lancaster, Pa.
I claim the supplementary lock, consisting of the bolt, I I, with its projecting arm, K, and the spring tumbler, I, with its curved flange and opening, the same being constructed and arranged as described, so as to be operated by an independent key for securing the main bolt of the lock in the manner substantially as set forth.

67,117.—FENCE.—William D. Hunt, Scott, N. Y.
I claim providing the wires of a wire fence with a series of spur wheels, substantially as and for the purpose set forth.

67,118.—CHURN DASHER.—A. B. Hurd, Watkins, N. Y.
1st, I claim the combination of the plug, C, at the bottom of the churn, with the tubular rod, A, sliding over it, for displacing the air, as herein set forth.
2d, The combination of the spiral wheels, d, with the dasher wings, b, arranged and operating in the manner and for the purpose set forth.
3d, I claim the special construction and arrangement of the churn dasher, with all its parts, as herein specified.

67,119.—FOLDING CHAIR.—Joseph Hyde, Troy, N. Y. Antedated July 18, 1867.
I claim the employment of the center arm pieces, C, in combination with the back pieces, B B, and with the lower pieces, D D, and each being so arranged and attached as to allow or permit the said chair or couch to be folded or unfolded in the manner and for the purposes substantially as herein described and set forth.

67,120.—PEN RACK.—Gustav Jedamski (assignor to William Staehlen), New York City. Antedated July 14, 1867.
I claim the spring, B, formed with a recess, a, and double springs, b e, as and for the purpose described.

67,121.—PROCESS OF MAKING STEEL.—Thomas H. Jenkins, Nyack, N. Y.
I claim melting wrought iron in crucibles or pots in admixture with a per centage of crude cast iron, after such crude cast iron has been treated, while in a highly heated state, in a bath, substantially as described.

67,122.—COMBINED FERTILIZER AND SEED SOWER.—Horace M. Keith, West Bloomfield, Mich., assignor to himself and F. A. Flower, Oakland Co., Mich.
1st, I claim the cylinders, H H, revolving in the box, G, and carrying fertilizing material for distribution, as herein specified.
2d, The bands, e e, with their strips, d d, in combination with perforated cylinders, H H, as and for the purpose set forth.
3d, The wings or flanges, J, within the perforated cylinders, as and for the purpose set forth.
4th, The arrangement of the cylinders, H H, claims, L L, divided axle, B, levers, D D, wheels, a a, and the box, E, with its slides, as and for the purpose set forth.

67,123.—BEEHIVE.—Ed. Kretchmer, Pleasant Grove, Iowa.
I claim the comb frames, R, provided with the bar, i1, and bars, o o i0, constructed and arranged substantially as and for the purpose described.

67,124.—SHELF BRACKET.—C. F. Kuhnle, Washington, D. C.
I claim the bracket, A, consisting of the pieces, a a', at right angles to each other, braced by supports, b, and provided with two or more projections, c, and flanges, d, substantially as described.

67,125.—WASHING MACHINE.—J. Lamb, Hubbardston, Mass.
I claim the said washing machine, as composed of the tub, A, the cover, B, the shaft, C, the handle, D, the cross, E, and the pins, F, combined and arranged in manner so as to operate substantially as described.

67,126.—WAGON BRAKE.—George Long, Marlboro Township, Ohio.
1st, I claim the peculiar combination and arrangement of the front bed piece, D, connecting link, K K, and compound levers, E I E I, substantially in the manner and for the purpose specified, and
2d, The peculiar combination and arrangement of the lever, O, with the lever, P, forming a compound anti-brake lever, substantially in the manner and for the purpose specified.

67,127.—MANUFACTURE OF ILLUMINATING GAS.—William L. Lowrey, Saratoga Springs, N. Y.
I claim, 1st, The manufacture of gas by roasting the material in a retort, and passing the gaseous products through a chamber partially filled with charcoal, at a high heat, and then through a condensing chamber filled with charcoal, substantially as described.
2d, The retort, A, in combination with the decomposing chamber, B, and the condensing chamber, C, when arranged and operated in connection with a cooking stove, range, or similar heating apparatus, substantially as set forth.

67,128.—SPRING WAGON.—Warren Mansfield, South Braintree, Mass.
I claim, 1st, The arrangement upon rockers, B, of springs, C, connected as described, with the wagon body at i, and
2d, The arrangement of volute spring brace, d, connected as described, with wagon body, H, and rocker, B, when the rocker carries springs, C, attached to the wagon body, substantially as described.

67,129.—DENTAL PLATE.—E. J. Merrick, Rochester, N. Y.
1st, The use of an elastic base over the entire surface of the upper jaw. and the back portion and sides of the palatine arch.
2d, The manner of making the elastic base smooth on the lingual side by means of its being vulcanized in contact with polished metal.

67,130.—MACHINE FOR CLEANING AND ASSORTING CRANBERRIES.—G. L. Merrill, Chicago, Ill.
I claim, 1st, The arrangement and combination of the adjustable chute-board, B M, partitions, D E, and reverse board, C, substantially as and for the purpose set forth.
2d, The combination of the board, K, and movable stop, N, when constructed as and for the purpose specified.

67,131.—DIE FOR MAKING PLOW BRACES.—Gilpin Moore (assignor to Deere & Co.), Moline, Ill.
I claim the dies, A and B, constructed substantially as shown and described, for making plow braces, as set forth,

67,132.—SLEIGH BRAKE.—Joseph Myers, Camden, Pa.
I claim the arrangement of the lever, B, connecting rod, C, with the levers, E G and I, shaft, I, and connecting bars, H and F, upon the sleigh or slide, as and for the purpose herein specified.

67,133.—ICE-CREAM FREEZER.—Charles W. Packer, Philadelphia, Pa.
1st, I claim the cross, B, hinged to and retained on the vessel, A, and carrying a wheel, G, having a recess adapted to receive the end of the dasher spindle, substantially as described.
2d, The combination of the cross bar, B, its plate, D, bevel wheels, G and F, spindle, E, and bevel wheel, K, on the cover of the vessel, I.
3d, The combination of the said cross bar, B, its plate, b b, and pins, e, with the studs, f f, on the vessel, A.
4th, The strip, K, arranged to vibrate on a dasher, substantially as set forth.

67,134.—COLLAR.—John H. Parmelee, Chicopee, Mass., assignor to himself and William Ball.

I claim as a new article of manufacture, a paper or cloth collar having one or more semi-circular, semi-elliptical, or rectangular slits or cuts in the band thereof, forming a tongue, made substantially as herein described and for the purposes specified.

67,135.—Gate.—Eli Petteys, Chestertown, N. Y.

1st, I claim the use of the bar, H, with its arm, J, with the segment, G, in combination with the rear bar of the gate and its pinion, as and for the purpose set forth.

2d, The cross bar, I, provided with its cords or rods, s s, in combination with the bar, H, as constructed and used, substantially as set forth.

3d, The shaft, i, provided with the oval collar and used in connection with the loops, a, as and for the purpose set forth.

4th, The arm, J, lever, K, spring, I, and latch, M, arranged and used substantially as and for the purpose set forth.

67,136.—Grate.—Nelson Pramer, Troy, N. Y. Antedated July 14, 1867.

1st, I claim the combination of a cylindrical or other shaped grate, A, with a stationary horizontal bar or support, D, in the manner and for the purposes substantially as hereinbefore fully described and set forth.

2d, The employment of the hook, C, in combination with the recess, E, by means of which the grate is operated in the manner and for the purposes substantially as hereinbefore described and set forth.

67,137.—Boat-detaching Tackle.—Thomas M. and Thomas J. Raser, Philadelphia, Pa.

1st, We claim, in combination with the two jaws of the hook pivoted together, as described, the spring, b, latch spring, c, with its catch, c', tongue, d, with its catch, e, and the groove, d', all constructed and operating substantially as described.

2d, In combination with a hook, constructed and operating as above described, I claim the pin, f, as and for the purpose described.

3d, In combination with a hook constructed and operating as described, I claim the check pin, i, and groove, j, as and for the purpose described.

4th, In combination with the tongue, d, and groove, d', I claim the guard plates, g, on each side of the tongue, arranged and operating as and for the purpose described.

67,138.—Winding and Setting Watches.—Henry Rothfelder, New York City.

1st, I claim the lever, B, lever catch, r, stud, s, and spring, m, in combination with the wheels, d e a and g, and with the button, h, all constructed and operating substantially as and for the purpose set forth.

2d, The cam-shaped shoulder, k, on the ring, j, in combination with the pin, i, and barrel, g, constructed and operating substantially as and for the purpose described.

67,139.—Brace for Bits.—W. F. Seavey, Portland, Me.

I claim the horizontal sliding slotted plate, C, when moving in the slot in the part, 2, of the bit brace and further secured by the screw, d, and having the three slots, 3 4 5, substantially as and for the purposes herein set forth and described.

67,140.—Combined Knob, Latch and Lock.—Balthasar Seegmüller, New York City.

I claim the hooked tumbler, f, pivoted on the bolt and provided with a knob passing through a slot in the lock case in combination with the saddle operated by the handle, substantially as and for the purposes set forth.

67,141.—Broadcast Seeder.—Jacob Slauder (assignor to himself and Levi C. Smith), Osborn, Ohio.

1st, I claim the reversible seed board, N, attached to the seed box as above shown when constructed and used substantially as and for the purpose described.

2d, The adjustable bottom, c c', of the seed box which may be elevated or depressed at pleasure, substantially as and for the purpose specified.

3d, The combination of the plow beams, K K, the plow standards, H H, the beam, G, and the lever, I, substantially as and for the purpose described.

4th, The arrangement of the alternate short standards, H', on the plow beams, K, and the long standards, H, affixed to the beam, G, substantially as and for the purpose specified.

67,142.—Coupling Reaches for Bob Sleighs.—Abraham L. Smith, Marengo, Mich.

I claim the arrangement and combination of the two metal reach bars, C and D, with each other and with a pair of bob sleds, when such bars are constructed and connected substantially in the manner and for the purposes herein set forth.

67,143.—Extension Gate.—C. S. Snead, Louisville, Ky.

I claim the peculiar construction of the gate, as herein described, to allow the expansion or contraction, the application of the intermediate washer, C, to prevent the rubbing of bars, the slots, D, to allow the extension and limit the same, and the foot roller, E, to prevent the sagging of the gate.

67,144.—Machine for Applying and Measuring Forces.—H. T. Stanard, Wayne, Mich.

1st, I claim the frame, F F F, in triple form, as described.

2d, I claim the combination of the double lever, C C, with the frame, F F F, as specified, to obtain a triple bearing for the fulcrum pin, thereby securing greater strength.

3d, I claim in combination the arms, N and R, index wheel, h, pointers, 3 and 4, scale, o o, chain or cord, 5 and 6, spring, 7, all combined and operating as specified.

67,145.—Mode of Preserving Dead Bodies.—Colin Cree St. Clair, Washington, D. C.

1st, I claim the preserving of dead bodies by encasing them in liquid cement compositions which harden by drying, substantially as and for the purpose described.

2d, The composition described composed of one part plaster of Paris with two parts of hydraulic cement, substantially as and for the purpose specified.

3d, The use of the glass plate, D, and the tube, E, in connection with the encasing of bodies in the composition or cement, substantially as and for the purpose described.

67,146.—Window Blind Fastening.—Theophilus Stover, Cambridgeport, Mass.

1st, I claim the construction of two latches, a a', upon the spring plate, B, for the purpose of being received and held by notched catches, substantially as described.

2d, The pin, E, constructed with a head, b', and shoulder or gage, b, upon it for the purpose of being used in combination with a latch spring, B, and suitable catching devices in the construction of a window fastening, as set forth.

3d, The back shoulder abutments upon the catches when the same are raised higher than the forward shoulders and prevent the latches passing too far back, as herein set forth.

4th, A reversible blind catch, D, which is adapted for being driven into vertical or horizontal joints between the brick of a wall, substantially as I have explained.

5th, The combination of lifting rod, g, and double catch or latch studs, a a', with a spring, B, which is applied to the bottom edge of a window and blind sustained by a pin, E, substantially as described.

67,147.—Cotton Press.—Edward Stuart, Shufordsville, Miss.

I claim the combination of the peculiar construction of cogs and eccentric wheel so as to prevent cogs from breaking with great pressure, as described in the specification.

67,148.—Potato Digger.—John M. Wilcox, Albany, N. Y.

I claim the revolving raking apparatus, t, and standing knives, v, in combination with the plow or scoop, f, and separator, w, substantially as and for the purposes set forth.

I also claim the reciprocating fingers, l, actuated in the manner specified, in combination with the separator, w, and plow, f, as set forth.

67,149.—Washing Machine.—Reuben B. Will, New Market, Va., assignor to Wesley H. Colton, Shenandoah County, Va.

1st, I claim the construction of a washing machine dasher of a drum, D, and studded arms, e e, arranged within a semicircular wash box having a concave bed of rollers, substantially as described.

2d, The centrally arranged rib, d, in combination with the removable covers, B, and the concave wash box having vibrating heating arms applied within it, substantially as described and for the purposes described.

67,150.—Melodeon.—Granville Wood, Detroit, Mich.

I claim the employment of an air chamber, C, over the reeds, F F, when the reeds are placed and arranged therein in such a manner that they do not receive the currents of air admitted by the swell direct, but changed in direction and equalized in force, substantially as and for the purposes herein specified.

67,151.—Rules for Calculating Time and Measures.—David W. Wright (assignor to Thos. L. Wright), New York City.

I claim the combination of the above described slide, a, having upon it initial day letters and otherwise marked and numbered, substantially as above specified, with stationary part of said scale constructed, marked, and divided substantially as above described.

67,152.—Cultivator and Seed Sower.—Henry Zurbrick, Elizabethtown, Ohio.

1st, I claim the hopper, H, hinged to the bed piece, I, the bed piece, I, hinged to the frame, J, and the frame, J, adjustably bolted or hinged to frame, A, as and for the purpose herein specified.

2d, The arrangement of the lever, L, and its connections with the frame, J, for the purpose of elevating its rear, and throwing the seeding apparatus out of gear, substantially as specified.

3d, The arrangement of the shanks, P, with the covering device attached to the same and with the adjustable frame, J, as and for the purpose specified.

67,153.—Baby Jumper and Cradle.—Robert Ashe, Somerville, Mass., assignor to himself and George W. Eldredge.

I claim the combination of the brace, A, the seat or cradle, B, and the rods, C, with their springs, a, when the latter are arranged and secured at such a distance apart as to prevent the seat or cradle from tipping to one side, substantially as set forth.

I also claim in combination with the above, making the springs, a, adjustable so that they can be advanced or withdrawn in order to increase or diminish their power of resistance, substantially as described for the purpose set forth.

I also claim making the front portion, 5, of the cradle removable so that the remaining portion may be used as a chair or seat, substantially as set forth.

67,154.—Construction of Fire-proof Safes.—H. H. Bryant, Boston, Mass.

1st, I claim the combination with the inner and outer walls or cases of a safe or other structure of a similar nature, of water, or liquid, vessels or tanks located between the said walls or case, under an arrangement substantially as herein described.

2d, The combination with the cases, a and d, of the removable water or liquid tanks or vessels, and flanges or supports by which the same are held in position in the space intervening between said cases, as and for the purposes described.

3d, In a safe or other similar structure as herein specified, I claim the construction and arrangement of one or more sides of the outer wall or case, so that the same may be readily removed without injury to the said structure, as and for the purpose shown and set forth.

REISSUES.

2,692.—Car Seat and Couch.—Horatio Allen, New York City. Patented June 12, 1866.

1st, I claim the combination with the floor and sides of a railroad passenger car of couches of rhomboidal form, placed diagonally to the length of the car, as herein described, and constructed of two seat pieces, A A', two corner pieces, E E', and two central posts, F F', and supported by frames and legs; said couches being convertible into a pair of seats by putting out of the way the two corner pieces, E E', and securing in a vertical position the center pieces, F F', by the cap pieces, G, said pair of seats having a relative position diagonal to the length of the car, all substantially in the manner and for the purpose herein described.

2d, I claim in combination with the seat herein described, and uses of a railroad passenger car, of upper couches of rhomboidal form, placed diagonally to the length of the car as herein described, and constructed of a frame supported as herein described, all substantially in the manner and for the purpose herein described.

3d, I claim the diagonal combination and construction of the two seats in the pairs of passenger seats in railroad cars, substantially in the manner and for the purpose herein described.

2,693.—Harvesters.—Thomas Brett, Geneva, Ohio. Patented Nov. 17, 1863.

1st, I claim so arranging the seat of harvesters that it may have a lateral movement upon a suitable frame or ways, in combination with one or more springs acting in concert with said seat, for the purpose specified.

2d, The frame, A, attached to the harvester, in combination with the plate, B, and spring, D D, all arranged to operate in the manner substantially as and for the purpose herein set forth.

2,694.—Horse Rake.—Adam R. Reese, Phillipsburg, N. J., assignee of Nathan Martz. Patented Feb. 26, 1856.

1st, I claim the combination in a two-wheeled wire-tooth horse rake of a rock shaft to support the rake teeth, located between the wheels and within their periphery, with a foot lever and a hand lever to raise and lower the teeth, and a seat to support the driver while operating the levers.

2d, Supporting the upper ends of the wire teeth of a two-wheeled horse rake by an iron rock shaft or rod arranged parallel to the axle or nearly so, within the periphery of the wheels.

3d, In combination with a two-wheeled horse rake having a stationary axle, a support for the teeth located within the periphery of the wheels, a seat for the driver, and a hand lever and a foot lever by which to raise or lower the teeth.

4th, The combination with the rake teeth of two bars arranged within the periphery of the wheels and parallel to each other (one to sustain the teeth against backward strain, while the other keeps them the proper distance apart), a lever to raise or lower the teeth, and a driver's seat from which the lever is operated.

5th, In combination with a two-wheeled wire-tooth horse rake, the support for the teeth located within the periphery of the wheels, the lever to raise or lower the teeth, the seat for the driver from which the lever is operated, and the springs, S', arranged and operating substantially as described, to assist in holding the teeth to the ground.

6th, In combination with a two-wheeled wire-tooth horse rake, a driver's seat; a hand lever by which the driver while in his seat can raise or lower the teeth, and a rock shaft independent of the axle to support the teeth, each being located between the wheels and within their periphery.

7th, In combination with a two-wheeled wire-tooth horse rake, having the upper end of the teeth attached to a rock shaft located between the wheels and within their periphery, a driver's seat and foot lever to raise or lower the teeth.

2,695.—Saw.—E. M. Boynton, Grand Rapids, Mich., assignee of Alfred Boynton. Patented Nov. 27, 1866.

I claim a saw provided with the cutting teeth, A, and the clearing teeth, B, constructed and arranged substantially as described.

2,696.—Car Brake.—J. A. Goewey and D. S. Wood, Albany, N. Y., and Joseph Jones, West Albany, N. Y., assignees of Wm. D. Goodnow by mesne assignments. Patented Oct. 18, 1864.

1st, We claim connecting the brake cars, F F, to horizontal guide bars affixed to the truck, substantially as and for the purposes set forth.

2d, In combination with the horizontal guide bars, k k, the spiral springs, H, to repel the brakes from the face of the wheels, substantially as set forth.

3d, Also in combination with the plank or hang frame, E, of the car body, and the brake cars, F F, the guide and safety rods, k k, arranged and operating substantially as and for the purposes set forth.

4th, Also the combination of the brake bars, F F, levers, G G', connecting bar, N, springs, H H, and chains, m o, with the truck wheels, B B, arranged and operating substantially in the manner and for the purposes shown and described.

2,697.—Fagot for Railway Rail.—Wm. Lewis, John Price, and Francis Naylor, Danville, Pa. Patented July 19, 1864.

1st, We claim the corrugated steel slabs or form pieces, A A', for fagots for railroad rails.

2d, We also claim forming the piles for the manufacture of steel-faced rails by the combination of iron bars with facing slabs of cast steel provided with intermediate projections on their inner surfaces, for the purpose of facilitating the welding of the steel to the iron, substantially as set forth.

2,698.—Fireplace.—John B. Ryan, Cincinnati, O., assignee of Calvin Dodge. Patented March 18, 1856.

1st, I claim the use of a deep recess or fire chamber placed back of the fire basket of the grate and out of the reach of the draft, in combination with the horizontal covering over the recess and fire basket of the grate and out of the reach of the draft, in combination with the covering over the recess and fire basket, extending down below the mouth of the chimney, constructed and arranged substantially as heretofore described, for the purpose of consuming the smoke and causing the ignition of the gas (which would otherwise be lost) and thus increasing the amount of heat thrown into the room, and by the slow combustion of the fire effecting a great saving of fuel.

2d, The arrangement in a fireplace, above the grate, of a reverberating covering, F, extending forward from the rear wall of the fire chamber to a point below the breast of the chimney, and employed to retard the products of combustion and direct the heat into the room, substantially as described.

2,699.—Fireplace Heater.—H. H. Welch, Athens, Ohio. Patented Aug. 8, 1865.

I claim as a new article of manufacture the fireplace heater, A, constructed as herein described, that is to say, with the projections or corrugations, D E, and pipes, B C, for the purpose explained.

2,700.—Meat Chopper.—Metropolitan Washing Machine Company, Middlefield, Ct., assignees by mesne assignments of C. A. Foster. Patented June 5, 1866.

1st, I claim the combination in a meat chopping machine with a vibratory cutter or cutters having a descending and transverse stroke, of a tub and mechanism for rotating the same intermittently, i. e., during the intervals between the strokes or while the cutter or cutters are lifted off the bottom of the tub.

2d, Forming the frame in two parts, one stationary, the other movable, the two being connected together by a horizontal hinge joint, or its mechanical equivalent.

3d, In a meat chopper frame composed of two parts united by a hinge joint as described, the combination with the movable part thereof of the vibratory cutters and such appurtenances of the machine as overhang, or are held within the tub, so that the said cutters and appurtenances may be bodily lifted out of the tub, as and for the purposes described.

4th, The combination with the stationary and movable frames of the locking device.

DESIGNS.

2,709.—Mirror Frame.—Russell Frisbie (assignor to E. Stevens & Co.), Cromwell, Ct.

2,710.—Caster Covering.—W. J. Howard, Petersburgh, Ky.

2,711.—Plates of a Stove.—Wm. L. McDowell, Philadelphia, Pa.

2,712.—Oil Can.—Charles Pratt, New York City.

PATENT OFFICE DECISION----METHOD OF NUMBERING COUPONS, ETC.

Elisha Foote for the Board.

The numbers of the coupons attached to goverment bonds have heretofore been printed on some part of the face of the coupons, and when such coupons have been stolen it was easy to change the number by adding a figure or perhaps by taking off one from some part that did not disfigure the engraving. The improvement consists in putting not only the numbers on the face but also upon the back of the instrument, and making the figures comprising the latter of such size as to cover the whole engraving on the back. By this device no figure can be added, for there is no room for it; no one can be abstracted for it would leave a vacant space; and none can be changed without defacing the engraving beneath it; and it is believed that a means of preventing a source of extensive frauds upon the public has thus been provided.

In engravings for bank bills such size and form have heretofore been given to the figures denoting the denomination that they could not be changed without destroying the bill, and in some cases the figures have been made to extend over the whole face of the bill, and the Examiner has regarded these as being in effect the same device and as anticipating the applicant's invention.

The figures in the bill were a portion of the engraving and constituted a part of the design of the artist. And when the plate had been made thousands of bills of the same form could be printed from it. It was a somewat different problem to make numbers that could not be counterfeited when they were to be stamped on an engraving already made, and each one upon the immense numbers of different coupons, was to be different.

It is said that the engraved figures having been made to cover the whole bill, there was little or no invention in making stamped figures do the same. This objection has great force, and seemed to the Examiner to be insurmountable. But on the other hand the new device is one of great practical utility and public importance. It was not so manifest as to occur to any one else before the applicant conceived it, and immense quantities of these coupons have been numbered in other ways and the public sustained gaeat losses in consequence. These considerations we think should determine the case in favor of the applicant. It often happens that inventions of great practical utility are made which being once produced seem to be entirely obvious; and we have sometimes to regard the results produced rather than the means that produced them, in judging of the sufficiency of an invention. While we are opposed, as strongly as any one, to patents for trifling and unimportant devices, at the same time, whenever a real improvement is seen, we believe that we act in accordance with the intent of patent laws and the spirit of judicial decisions in giving to it a favorable consideration.

The Examiner's decision is reversed.

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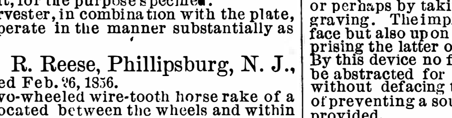

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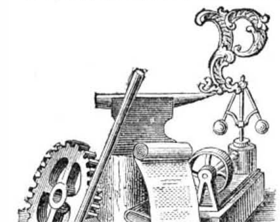

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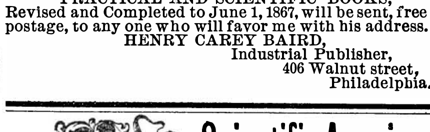

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